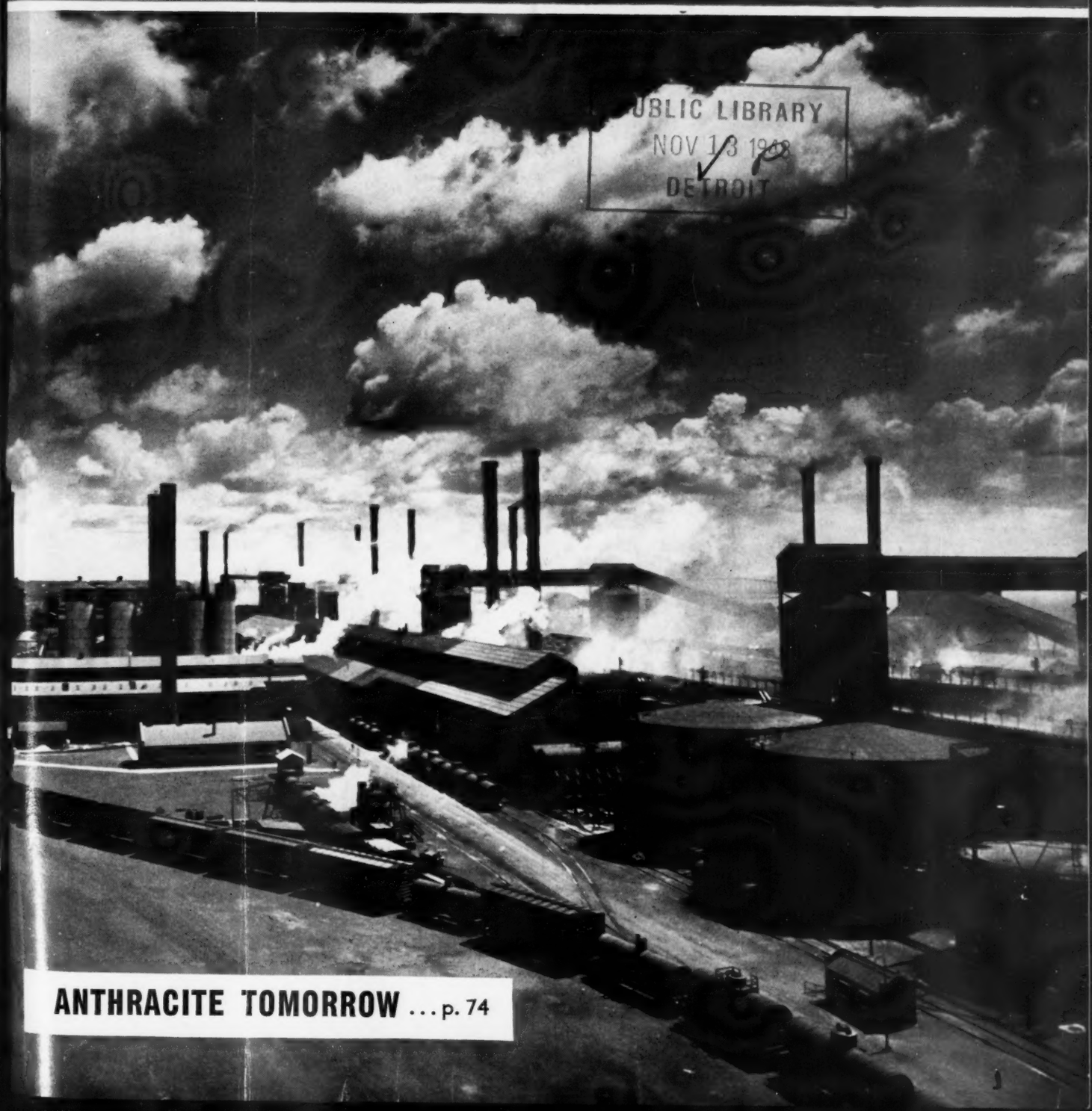
Coal Age

A McGRAW-HILL PUBLICATION

NOVEMBER, 1948



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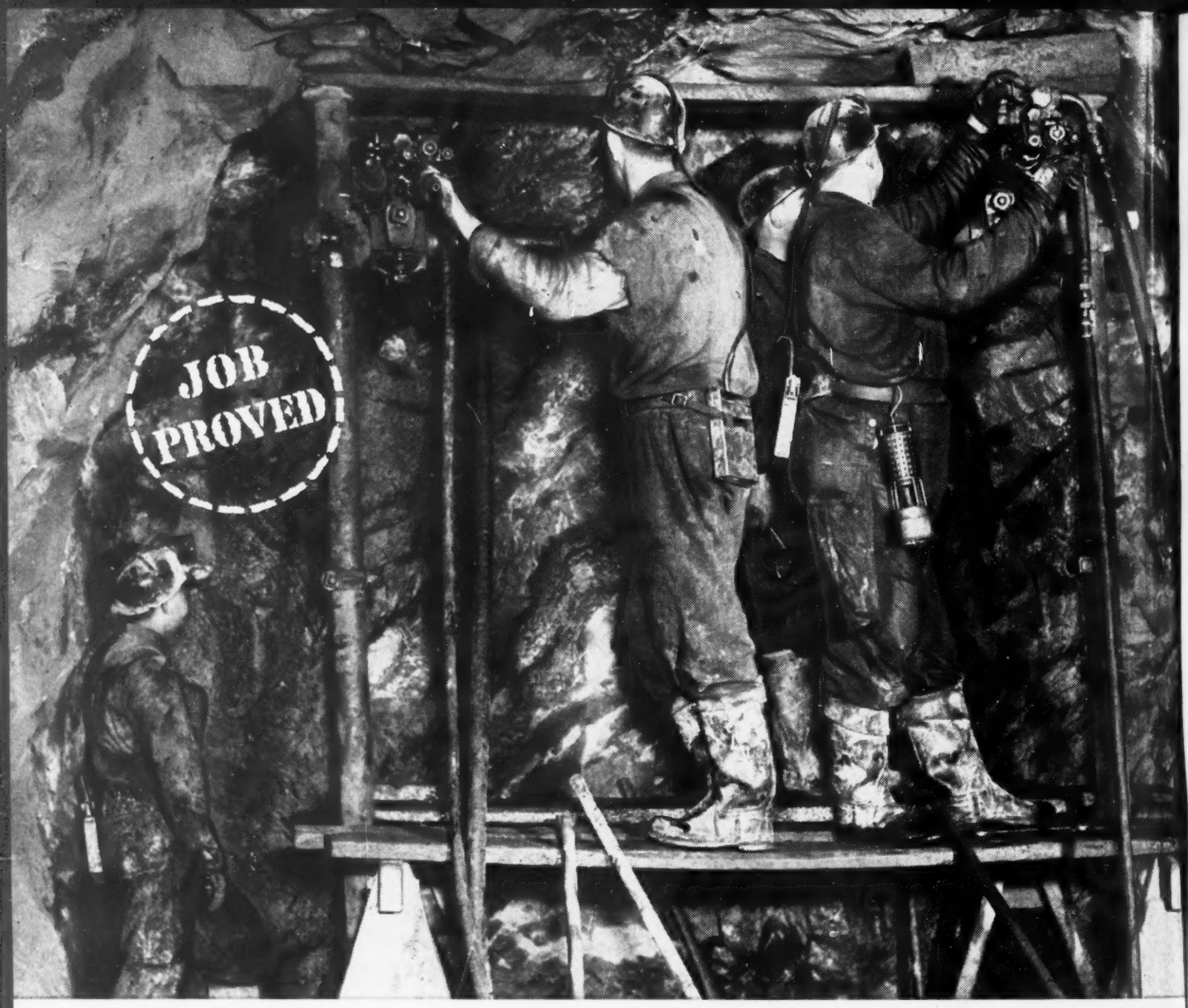

PARTS REPLACEMENT REDUCED 67%

Sun Rock Drill Lubricant Also Helps Speed Drilling

Drillers in a Pennsylvania mine kept running into costly delays because the lubricant in use just wouldn't stay in the drills. Even with frequent applications, parts had to be replaced often.

Asked for his advice, a Sun engineer recommended Sun Rock Drill Lubricant . . . one of the complete line of Sun oils "Job Proved" for heavy-duty use in mine machinery.

Checking the record after 17 months, the operator found that parts replacement had been reduced 67 percent since adoption of Sun Rock Drill Lubricant for the job. Drillers report that this oil stays in the drill longer, gives constant lubrication, requires fewer applications. Results: Holes drilled faster, and at lower cost!

In mine after mine, Sun "Job Proved" lubricants help to achieve maximum protection for machinery, minimum maintenance costs. For full information, call your nearest Sun Office.

SUN OIL COMPANY · ***Philadelphia 3, Pa.***
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SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

Research keeps
B.F.Goodrich
FIRST IN RUBBER

Nylon shock shields help these mine tires do four jobs at once

THE B. F. Goodrich *Universal* tires shown above have about the toughest job of any tires, anywhere. They're in a Hart-Ross Coal Co. *temporary* mine in western Kentucky. Here, there are no permanent installations. Everything is "in the raw."

Tires must stand up under extreme loads on the rough, uneven floors; must give top traction in mud, even on muddy grades. Tread, shoulders and sidewalls must withstand jagged slate, broken coal and rubbing against ribs. And, in spite of this tough service, tires on tractors and shuttle cars must do still another job — they must *last,* keep costs down!

Mr. Brent Hart, President of Hart-Ross Coal Company, stated that his company has been using rubber-tired equipment underground since 1937. "We were the first company to install rubber tires," Mr. Hart said. "We have had more than average experience with them and find B. F. Goodrich Silvertowns give excellent service."

A large part of the reason why B. F. Goodrich "Universal" Silvertowns stand up and wear longer than ordinary tires is the nylon shock shield now built into *all* B. F. Goodrich truck tires, size 8.25 and larger.

The nylon shock shield consists of layers of *nylon* cord between the tread and the body plies. Under load and under impact, the strong, elastic nylon *shields the rayon cord body.*

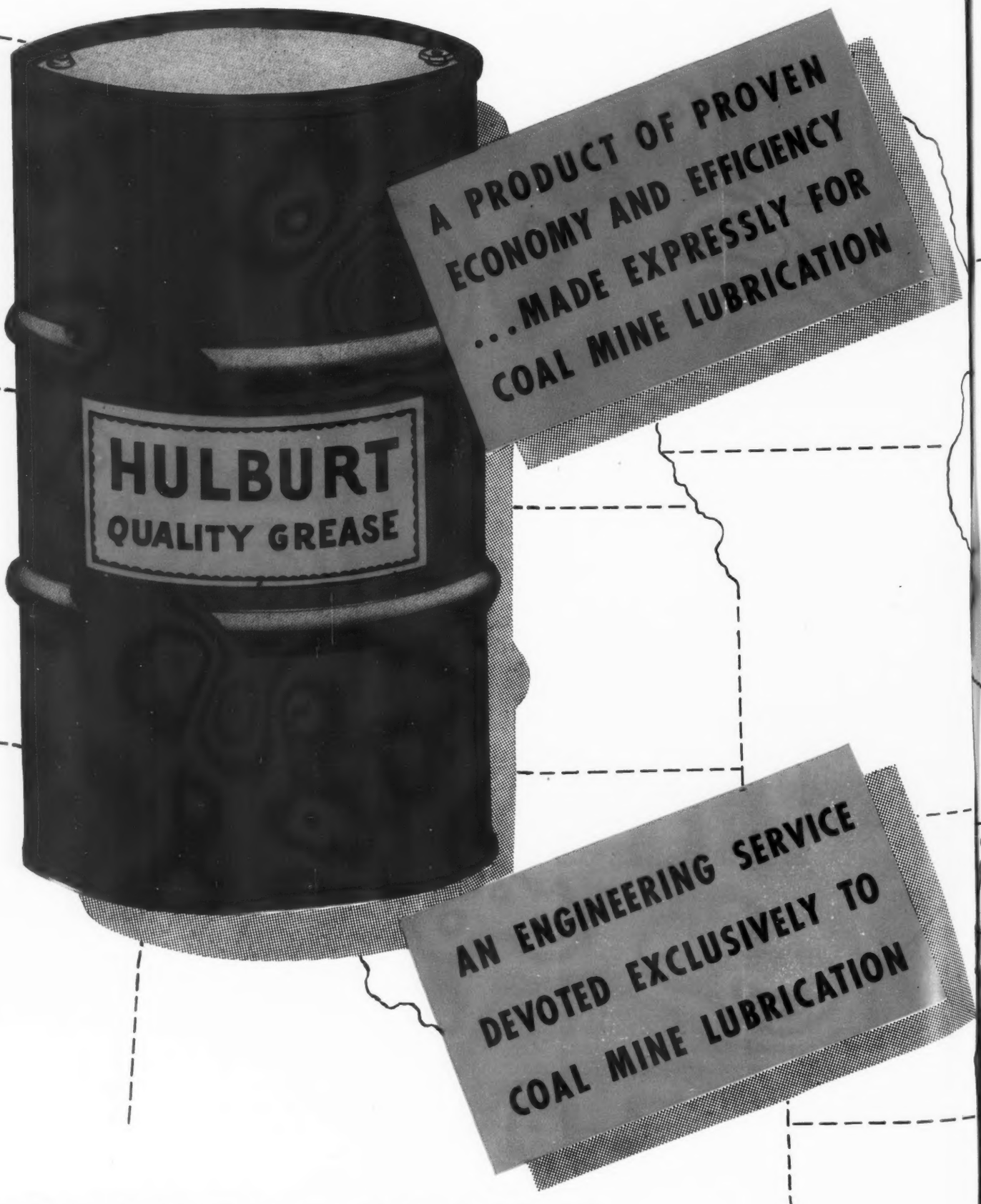
Only B. F. Goodrich gives you the added protection of the nylon shock shield... the additional saving through (1) longer tire life, (2) increased number of recappable tires, (3) increased bruise resistance, (4) less danger of tread separation. And the nylon shock shield costs nothing extra.

There is a specially designed B. F. Goodrich off-the-road Silvertown for every need. See your B. F. Goodrich dealer or write us direct. *The B. F. Goodrich Company, Akron, Ohio.*

Truck Tires BY

B.F. Goodrich

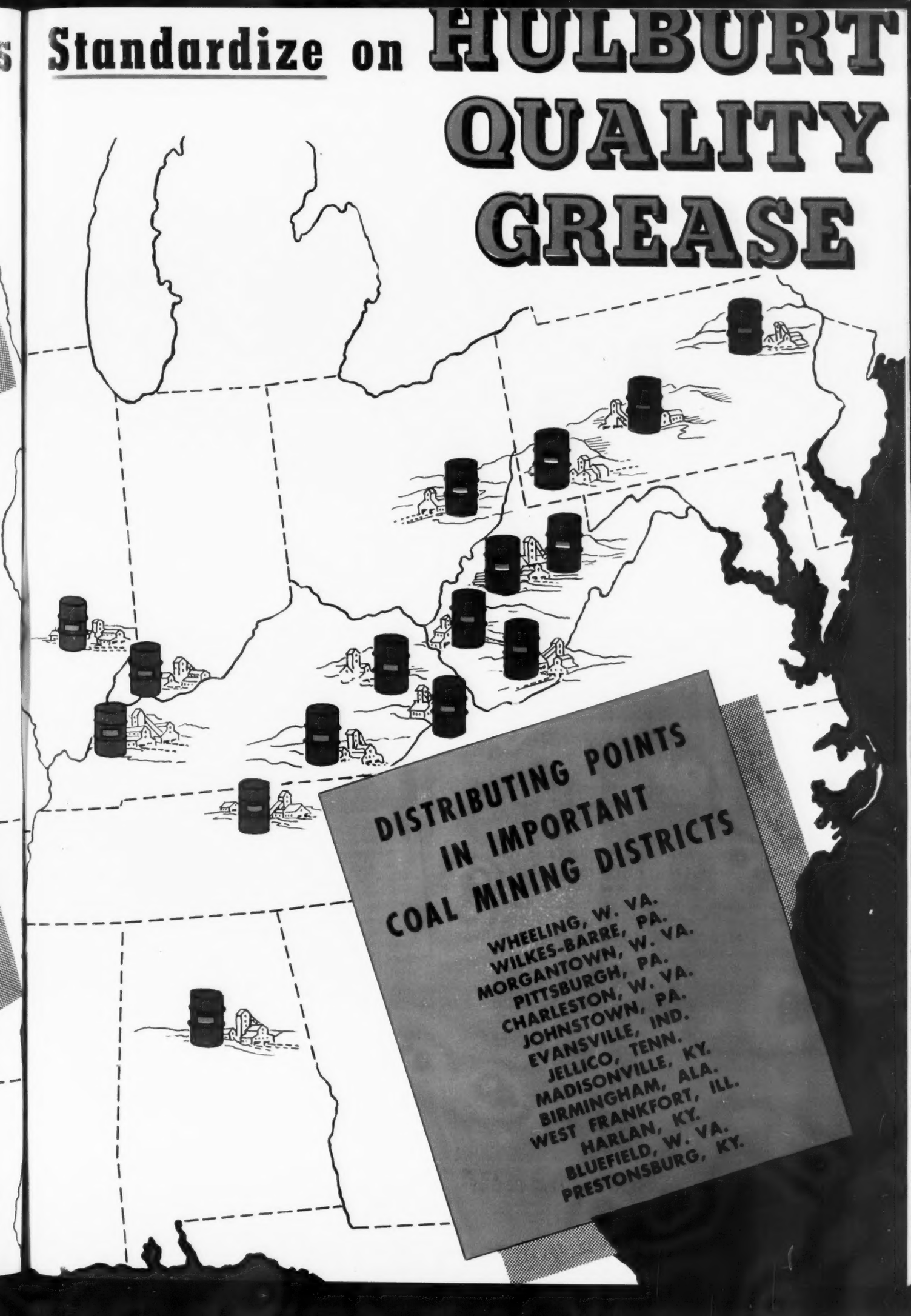
3 Reasons why Mine Operators


HULBURT
QUALITY GREASE
A PRODUCT OF PROVEN ECONOMY AND EFFICIENCY ...MADE EXPRESSLY FOR COAL MINE LUBRICATION
AN ENGINEERING SERVICE DEVOTED EXCLUSIVELY TO COAL MINE LUBRICATION

HULBURT OIL & GREASE CO.

PHILADELPHIA, PA.

SPECIALISTS IN COAL MINE LUBRICATION


Standardize on HULBURT QUALITY GREASE
DISTRIBUTING POINTS IN IMPORTANT COAL MINING DISTRICTS
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MINING MACHINE CABLE WITH *THIS COMBINATION*

IS WITHOUT EQUAL FOR SAFETY AND LONG LIFE

No matter how good a service record a Hazard Cable earns, Hazard Engineers are never satisfied. They keep seeking for ways to make it better. When they find one, they put it into effect.

So now, with Hazard Mining Machine Cable, you get the additional benefits of a new Hazaprene ZBF Jacket — at no extra cost. This improved jacket has greater resistance to flame and mechanical damage than was ever obtainable before. The Hazaprene ZBF Jacket is a double layer, reinforced, pressure-cured, unusually dense *seal against trouble.*

Beneath this new safety and toughness, you also obtain the advantages of flexible Hazaloy-coated conductors . . . safer, longer-lived Hazard heat-resisting rubber insulation that takes in its stride current overload surges. And for still more moisture-resistance, cushioning qualities and flexibility, Hazaprene fillers are used in the conductor interstices of multi-conductor cables in place of the old-style fibrous fillers.

*ZBF ZINC BORATE FORMULA

Flame tests have shown that Zinc Borate imparts greatly increased fire-resistant properties to neoprene compounds with burning rates reduced by as much as 20% and weight losses by as much as 40%. Afterglow is materially reduced also. Millions of feet of cable protected by this type of jacket were used during the war by the Navy for special operating conditions to gain extra fire protection. Hazaprene ZBF Jackets mean not only greater safety because of unusual flame-resistance and lack of afterglow — but also longer life through increased resistance to abrasion, wear and tear.

Why not get in touch with your Hazard Representative now and talk to him about your new mining machine cables, or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

7062

insulated wires and cables for every mining use

Coal Age

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One big advantage of Bethlehem prefabricated track is that it's easy to install. Expert trackmen are *not* required. There's no large and confusing variety of parts; what's more, special rails are numbered to facilitate assembly. The job of installation really *moves*.

This basic simplicity is the result of long and careful study by Bethlehem engineers. The creation of simple, efficient mine track wasn't an overnight job. But now Bethlehem has developed it to a fine point, and we repeat—this is track that even green hands can quickly and easily learn to assemble.

The layout you get is designed for your individual mine. Rails are precurved to the proper radii; precut and delivered to you ready to drop into place. Every detail follows the plan that has been checked and approved by you in advance.

We've got something really good here. It's proving out in many mines, and plenty of others are showing interest. Why not talk with us about it? Say the word and we'll be glad to give you the full story.

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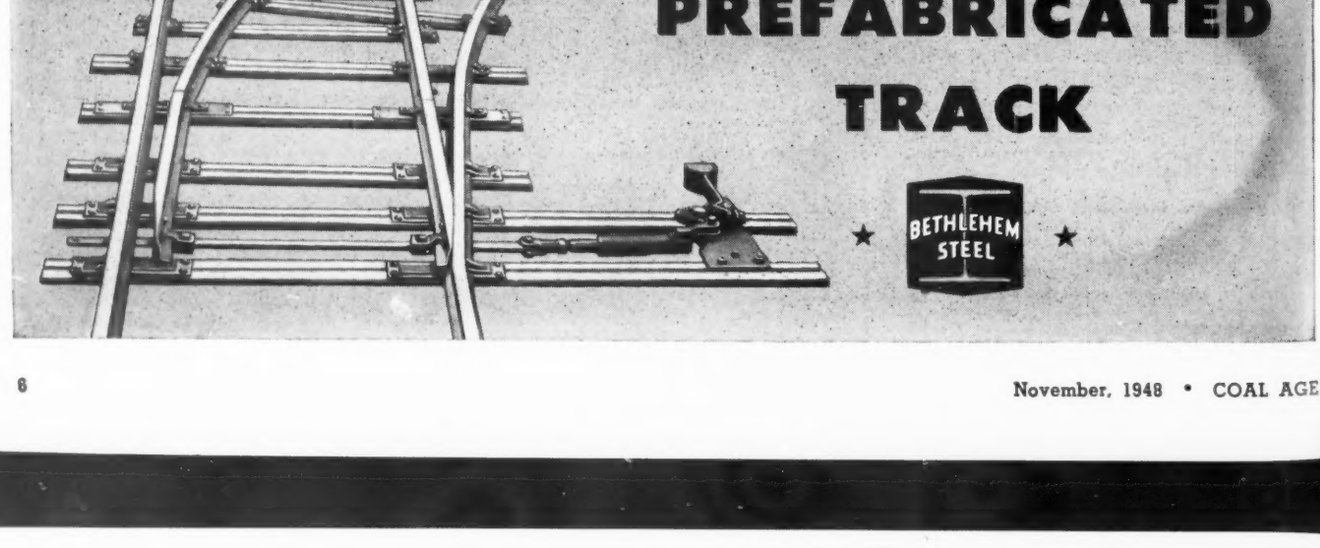
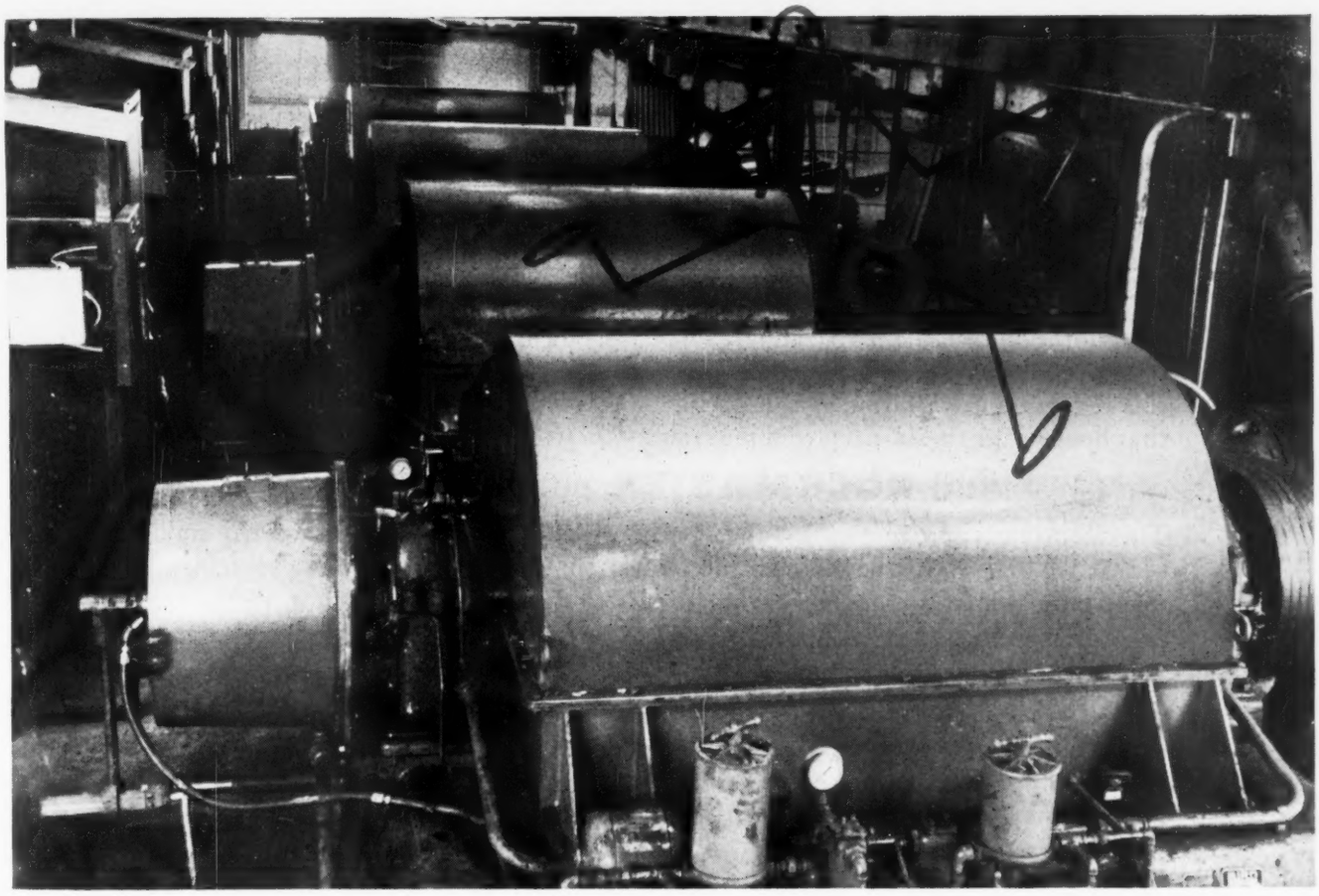


IF YOU CLEAN YOUR COAL

BIRDS *Like These*

PUT YOU A LONG STRIDE AHEAD



Bird Continuous Centrifugal Filters, like these, do the best job of taking the water out of fine coal. That goes whether you clean the fine coal separately with tables or launders or whether you take it from jigs or sludge tanks.

The Bird discharges well-blended, uniformly dried fine coal. Moisture content is as low as can be obtained by any combination of other equipment. Water is so clean that a closed water system becomes a reality. Let us mail you the complete story.

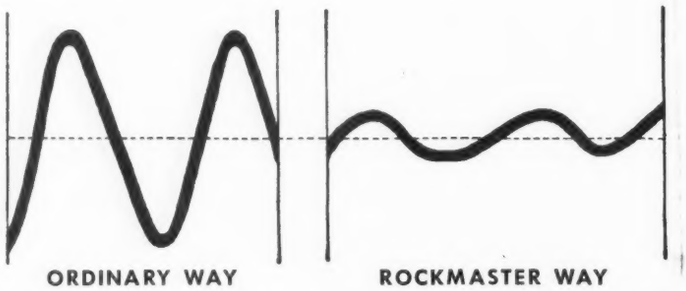
BIRD MACHINE COMPANY
South Walpole · Massachusetts

THE BIRD CONTINUOUS CENTRIFUGAL **FILTER**

Through Better Use of Energy

ROCKMASTER

Stopped Objectionable Vibration on This Job



ORDINARY WAY — *An 11 hole blast using 3300 lbs. of dynamite fired by ordinary methods produced this reading on a seismograph used to record the vibration.*

ROCKMASTER WAY — *This ROCKMASTER blast used 12 holes and 3575 lbs. of dynamite, yet the seismograph reading showed only one-third the amount of vibration.*

The vibration record of two comparable blasts, one fired by the Rockmaster blasting system and one by ordinary methods, is shown above. It is easy to see how important this reduction in vibration is to quarries, construction jobs and coal stripping pits that operate near residential communities.

and **ROCKMASTER** cuts costs, too!

The Rockmaster system splits up a big blast into smaller ones, staggered milliseconds apart. That's how it controls vibration. And that's why it also achieves these other important money-saving results!

1. ***More rock ready for the shovel.***
2. ***Better fragmentation***—less secondary blasting.
3. ***Far less "back-break"*** in quarries. Less pulverizing of coal in strip pits.
4. ***Wider spacing of drill holes*** can frequently be used, saving drilling costs and explosives costs.
5. ***Better control of "throw."***

Call in the Atlas representative today. He will be glad to give you the benefit of Atlas pioneering in milli-second delay blasting.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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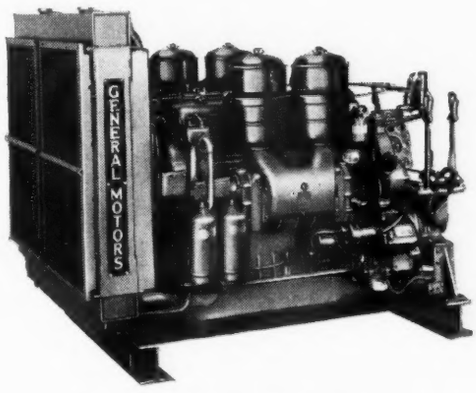
Paid for Itself in the First 4 Months

Bucyrus-Erie Monighan crane, recently repowered by GM Series 71 Diesel "Twin," strips 25-ft. sandstone overburden in Indiana coal fields. Engine operates 24 hours a day, 7 days a week.



The General Motors Diesel Series 71 Industrial "Twin."

IT doesn't take General Motors Diesel engines long to pay for themselves. For they get down to business at the word "go," and keep on the go steadily, getting more work done and getting it done faster.

Take the case of The Maumee Collieries Co., Terre Haute, Indiana, who installed a GM Diesel Series 71 "Twin 6" in their 5-yd. "walking crane" less than a year ago.

What happened? Production took a jump of 25%, maintenance costs nose-dived. The manager tells us the engine paid for itself in increased output in the first four months.

There are good reasons for this performance—rugged design and precision manufacture, two-cycle operation, a smooth flow of plenty of power, quick pickup of load and the always-ready-to-go qualities of these GM Diesels.

This kind of Diesel power is paying off in all types of mining operations. Better check into it. Get the facts from your local GM Diesel dealer or write direct to us.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES.. Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS.. Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

LOWER SURFACE MINING COSTS

with Tried and Tested Earth-Moving Equipment

More and more miners are recovering coal by surface stripping — the modern, lower cost, safer way. Coal tonnage obtained by strip methods is now over four times higher than in 1936.

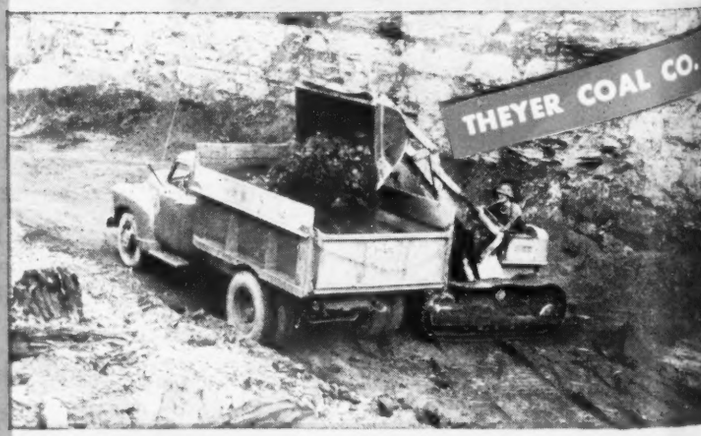
In keeping with their modern mining methods . . . many alert, cost-conscious strip-miners are using modern, powerful Allis-Chalmers tractors and motor graders . . . proved, widely used earth-moving equipment.

Modern mining with modern equipment means BIG TONNAGE at LOWEST COST.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U.S.A.

BIG VOLUME . . .

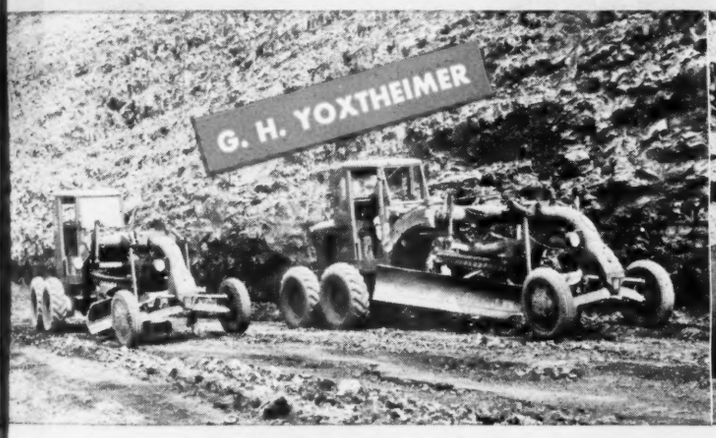
SMOOTHING THE WAY

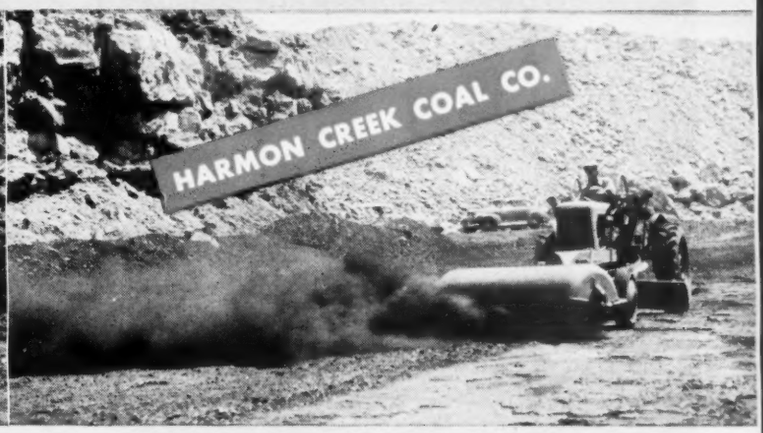


FAST, LOW COST LOADING

Loading coal into trucks with this economical Allis-Chalmers HD-5 tractor and Tracto-Shovel saves money for the Theyer Coal Co., Hackett, Ark. Versatile, all-'round, you can also use this outfit for loading any loose material and for excavating and loading dirt. Interchangeable attachments further widen its usefulness — available with bulldozer blade, snowplow, snow loader bucket, various sizes of material handling buckets and bucket teeth.

Fleets of Allis-Chalmers Model HD-19 Hydraulic Torque Converter Tractors team-up with large capacity, 24 cu. yd. Gar Wood scrapers to strip huge volumes of yardage for Badgett Mine Stripping Corp., Ky. The rugged and tough HD-19 — the WORLD'S LARGEST TRACTOR — outpulls and outperforms any tractor ever built.

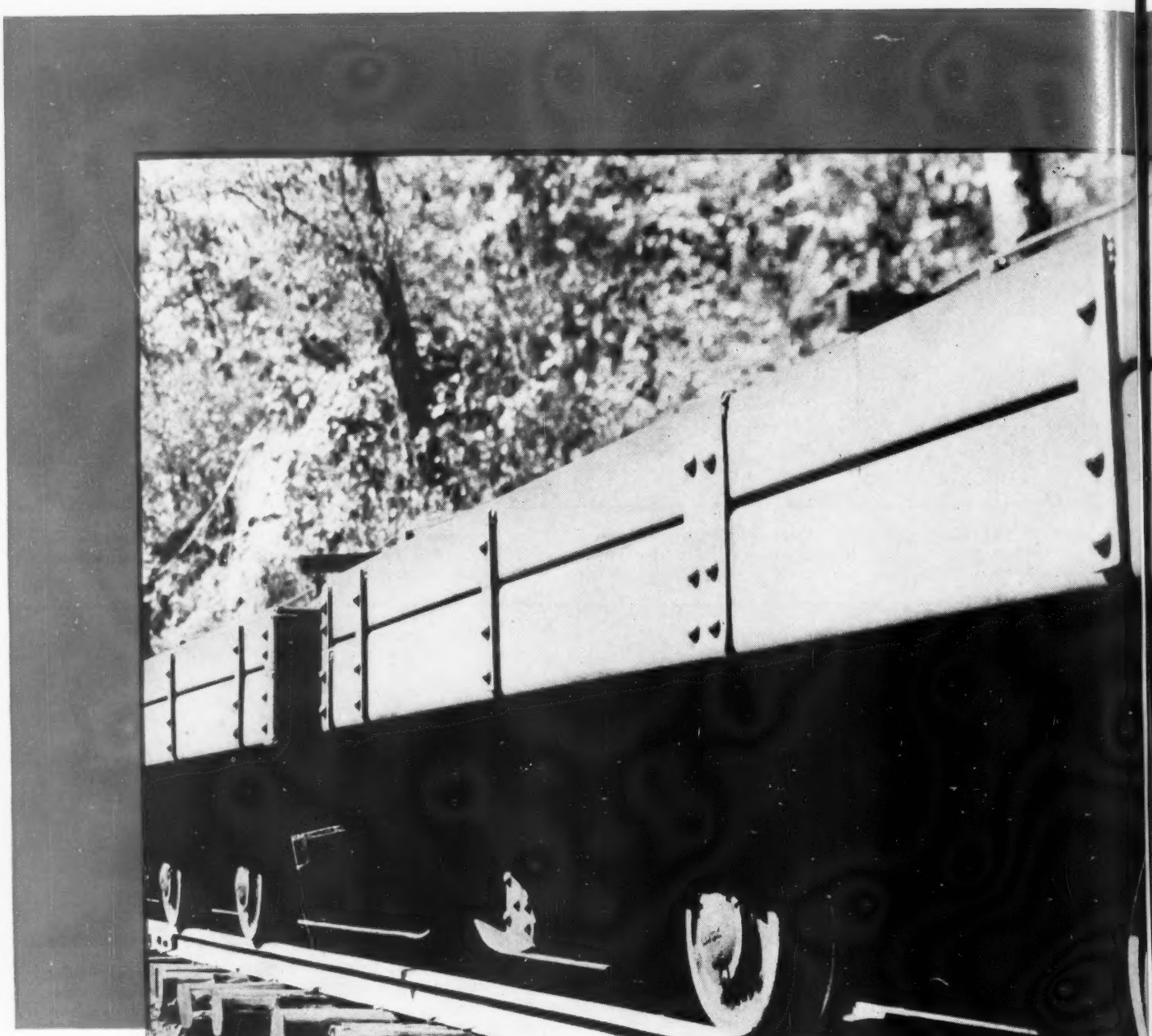


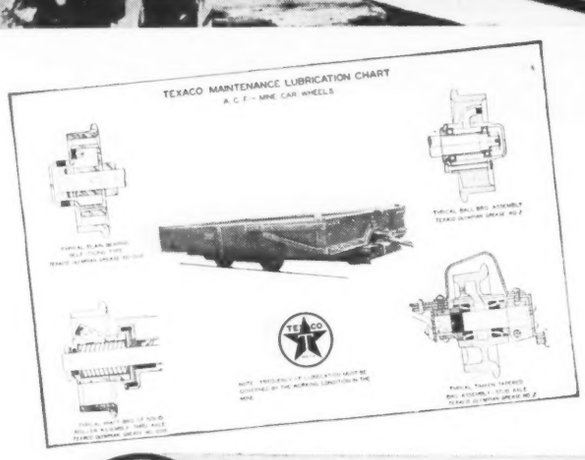


Building haul roads and keeping them smooth . . . cleaning coal beds . . . scarifying bony and clearing it from coal beds are some of the jobs of these powerful Allis-Chalmers Model AD Motor Graders for Manville Collieries Co. near Terre Haute, Ind. and G. H. Yoxtheimer, Northumberland, Pa. Another Allis-Chalmers Motor Grader — the low cost W-Speed Patrol — is a popular outfit with miners for sweeping coal . . . besides being an especially economical machine for maintaining haul roads — shown cleaning a coal bed at the Apex mine for Harmon Creek Coal Co., Hopedale, Ohio.

TEAM WORK Assisting big strippers, thereby keeping down stripping cost, are the main jobs of these fast-working, smooth-operating HD-19's for Maumee Collieries Co. at Jasonville, Ind., and Northern Illinois Coal Co., Coal City, Ill. They clean up around the strippers and push material within reach . . . also level roadbeds for strippers . . . clean roadways for blast hole drills . . . build roads, strip hillside seams, level spoil banks and pull heavy equipment, among other jobs.

MODERN MINING WITH MODERN EQUIPMENT MEANS BIG TONNAGE AT LOWEST COST!





TEXACO MAINTENANCE LUBRICATION CHARTS. Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricants. Order the charts you need by make and model of each machine.

Tune in . . .
TEXACO STAR THEATRE
every Wednesday night
starring Milton Berle.
See newspaper for
time and station.

TEXACO

TEXACO LUBRICANTS

Get cars off to *Easier Starts*

Even in cold weather, wheels lubricated with Texaco Olympian Grease start easier, run easier

YOU can count on uninterrupted movement of tonnage when you assure easier starting and running by lubricating mine car wheels with *Texaco Olympian Grease.*

Texaco Olympian Grease is made in three consistencies for mine service. It resists oxidation, separation and leakage . . . maintains effective protection under severe conditions of cold and heat, dirt and moisture. Use it in plain, cavity hub and anti-friction bearings . . . for longer bearing life, lower maintenance costs.

Use *Texaco Olympian Grease* also on loaders and similar equipment. Here, too, it gives outstanding protection and reduces maintenance costs.

Let a Texaco Lubrication Engineer help you in the selection of the right lubricants for *all* your equipment. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

GROWING WITH COAL!

No. 6 . . .

The Might of MEN and MACHINES

Thus far this coal series has brought to your attention the 68,000 C & O coal cars serving the coal industry; the 1200 coal burning locomotives on the C & O; the increased capacity of C & O yards, and the installation of the most modern of devices to speed the movement of coal. All this physical equipment is of vital importance to the coal industry. But even superceding it in importance, is the diligent and devoted service of thousands of alert C & O personnel who exact the highest measure of efficiency from the machines in moving coal from mine to market. Let's take a brief look at the operations of this great group of workers — the C & O men and women behind the C & O machines.

- There are 42,000 of us, a majority of whom are directly concerned with the efficient movement of coal.
- The Coal Traffic Department is assigned specifically to the service of the coal industry. With offices in a dozen principal cities, these traffic experts are equipped to follow through on all details of the movement of your coal to destination.
- The Coal Development Department keeps a watchful eye on the 6,500 square miles of coal lands served by Chesapeake and Ohio. The coal reserves of these lands are estimated at ten billion tons.
- The Car Distributing Office is responsible for the distribution of empties to the 348 mines served by Chesapeake and Ohio. This indeed has been an outstanding job during these days of tight car supply.
- C & O was the first railroad to establish a Fuel Service Engineering Department. It is staffed with trained combustion engineers who devote their entire time in promoting increased efficiency and greater utilization of coal, and demonstrating the advantages of coal as compared with other fuels.
- Many others are "at your service" day and night — the transportation, terminal and yard organizations; the men who run the coal piers at Toledo and Newport News; the thousands who see that your coal moves promptly and smoothly to destination. Stated very briefly — 42,000 Chesapeake and Ohio men and women stand ready to serve you—*and coal.*

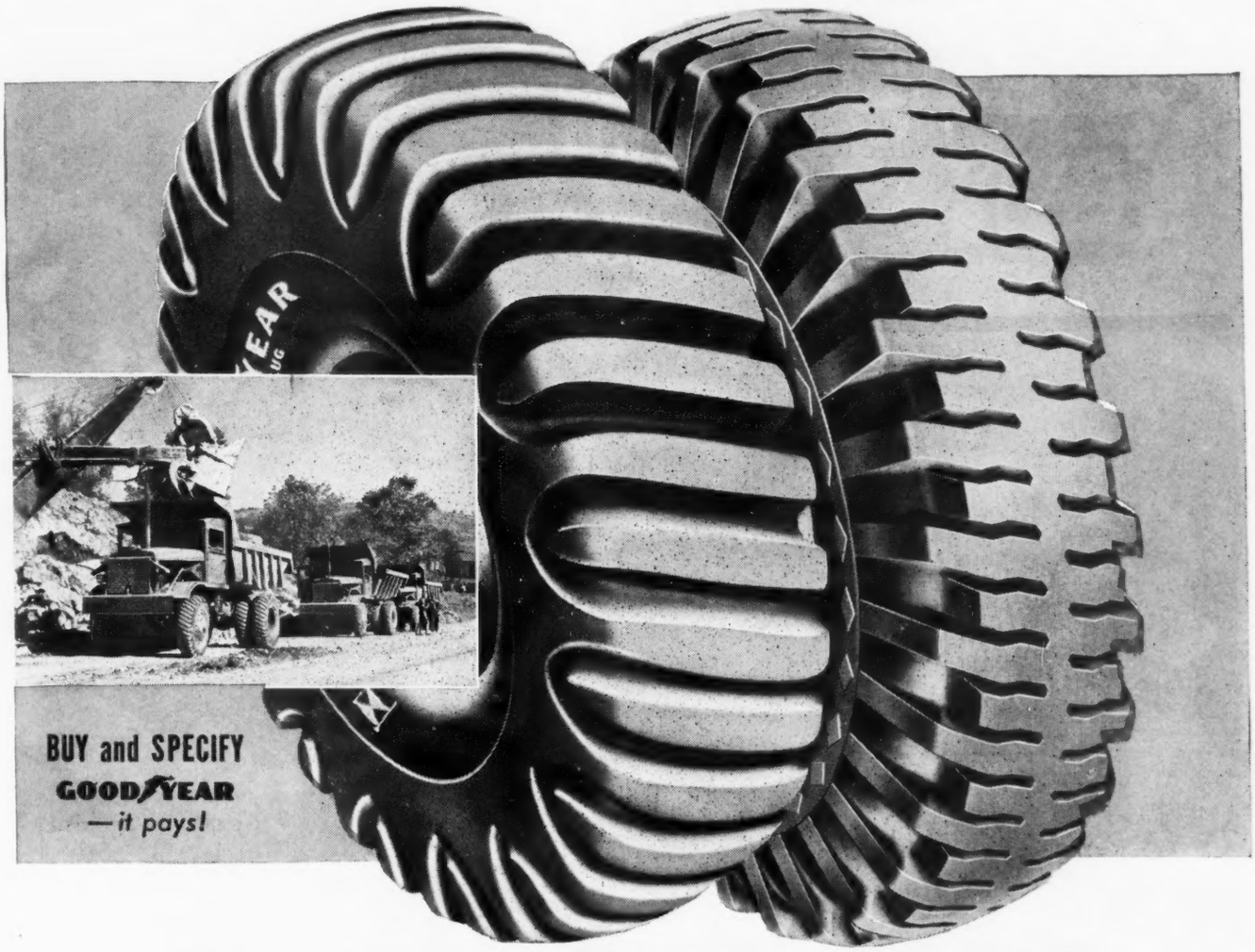
C AND O

CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World

HARD ROCK LUG — for off-the-road duty in body-bruising, tread-battering service. Massive lug bars armor tread and sidewalls against cutting. Extra-thick undertread protects carcass from bruises. Super-strong rayon cord body gives extra stamina and longer life.

ROAD LUG — engineered for service both OFF and ON the road. It's bodied with tough, heat-resisting rayon cord for super-strength and bruise resistance. Extra-heavy tread provides full resistance to cutting and snagging; has alternate long and short bars so it can dig in for traction and still roll smooth and long on highways.



Double-Duty Team

for low-cost mine and quarry hauls

THESE two great Goodyear tires can cut your cost on every type of mine and quarry haul.

Both are tailored to meet particular operating conditions—the Hard Rock Lug is *right* for all off-the-road duty—the Road Lug is *right* for hauling both *on* and *off* paved roads. *Both* cut your hauling costs to the core.

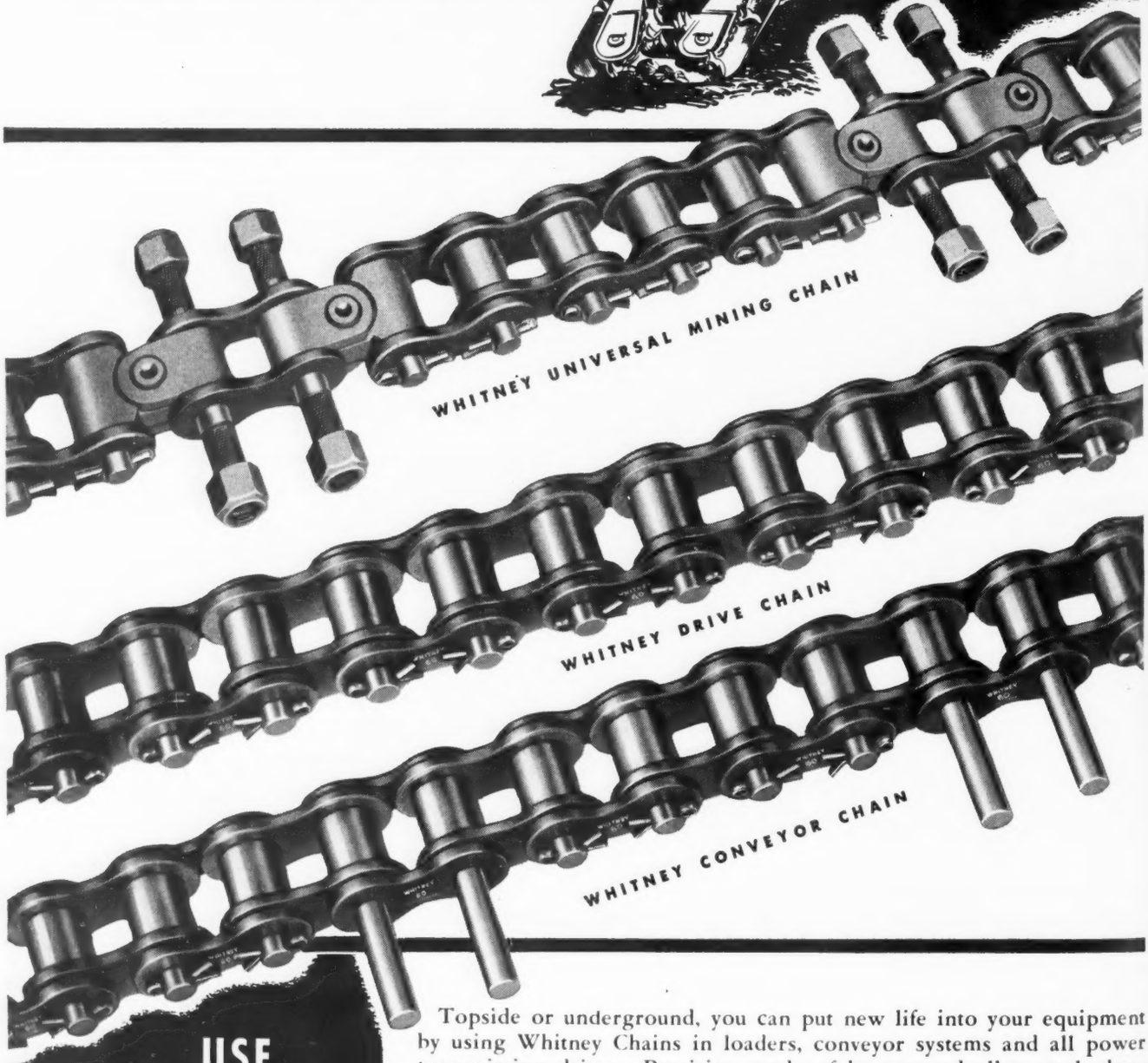
It always pays to equip with Goodyear tires that are "right" for your particular needs. Consult your Goodyear dealer for his recommendation.

Road Lug—T.M. The Goodyear Tire & Rubber Company

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Slash Operating Costs... INCREASE TONNAGE OUTPUT



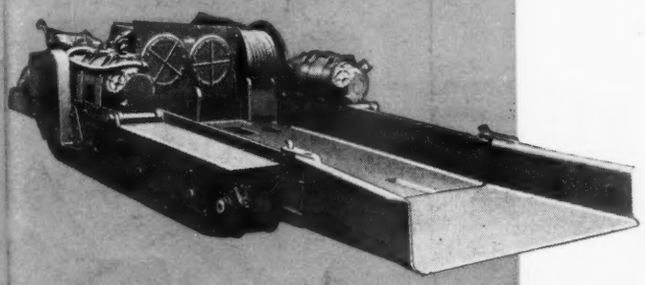
USE Whitney Chains

Topside or underground, you can put new life into your equipment by using Whitney Chains in loaders, conveyor systems and all power transmission drives. Precision made of heat-treated alloy steel, these chains take the abuse of the severe operating conditions encountered in mining. They resist shock loads without breakage . . . give long-lived performance . . . require minimum maintenance. Remember to specify Whitney Chains for extra dependability when you buy new equipment. And for over-all drive efficiency, complete your drives with Whitney Cut Tooth Sprockets.

To maintain top tonnage and cut operating costs, it will pay you to *Standardize* on Whitney. See your nearest distributor or write:

WHITNEY CHAIN & MFG. CO. *Division of Whitney-Hanson Industries, Inc.*
210 HAMILTON STREET, HARTFORD 2, CONN.

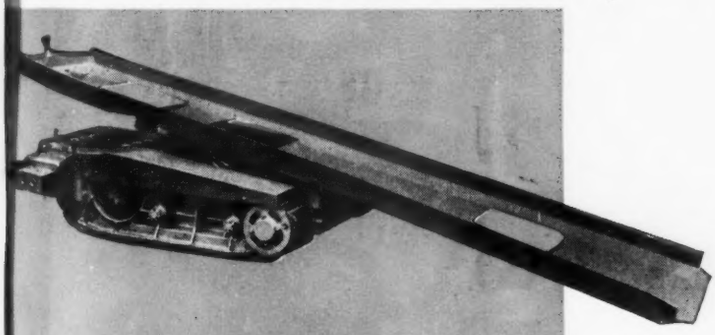
JOY T2-6 MINING MACHINE TRUCK—designed to carry all standard makes of shortwall cutters in low seams. Reduces tramming time by eliminating rope-hauling and jack-settings. Cutters can be spotted accurately, and loading and unloading takes only a few seconds.



It's true—the more you MECHANIZE

—the more you SAVE!

JOY T-12 UTILITY TRUCK—designed to carry conveyor pans, chains and flights, tools, and miscellaneous equipment in low-seam trackless mining. Battery-powered and can be turned in its own length.



JOY T-1 MINING MACHINE TRUCK—for transporting all standard makes of shortwall cutters in medium and high seams. Saves production time by moving cutters rapidly and spotting them at the exact place to be cut. Also usable for towing and other transporting jobs.

JOY UTILITY MINING TRUCKS

Consult a Joy Engineer

As the pioneer in modern mechanized mining, and the world's largest manufacturer of underground mining equipment, JOY can help you to realize important production gains and cost reductions. There's an efficient JOY machine for every mining job—*write for bulletins.*

W&D CL 2068

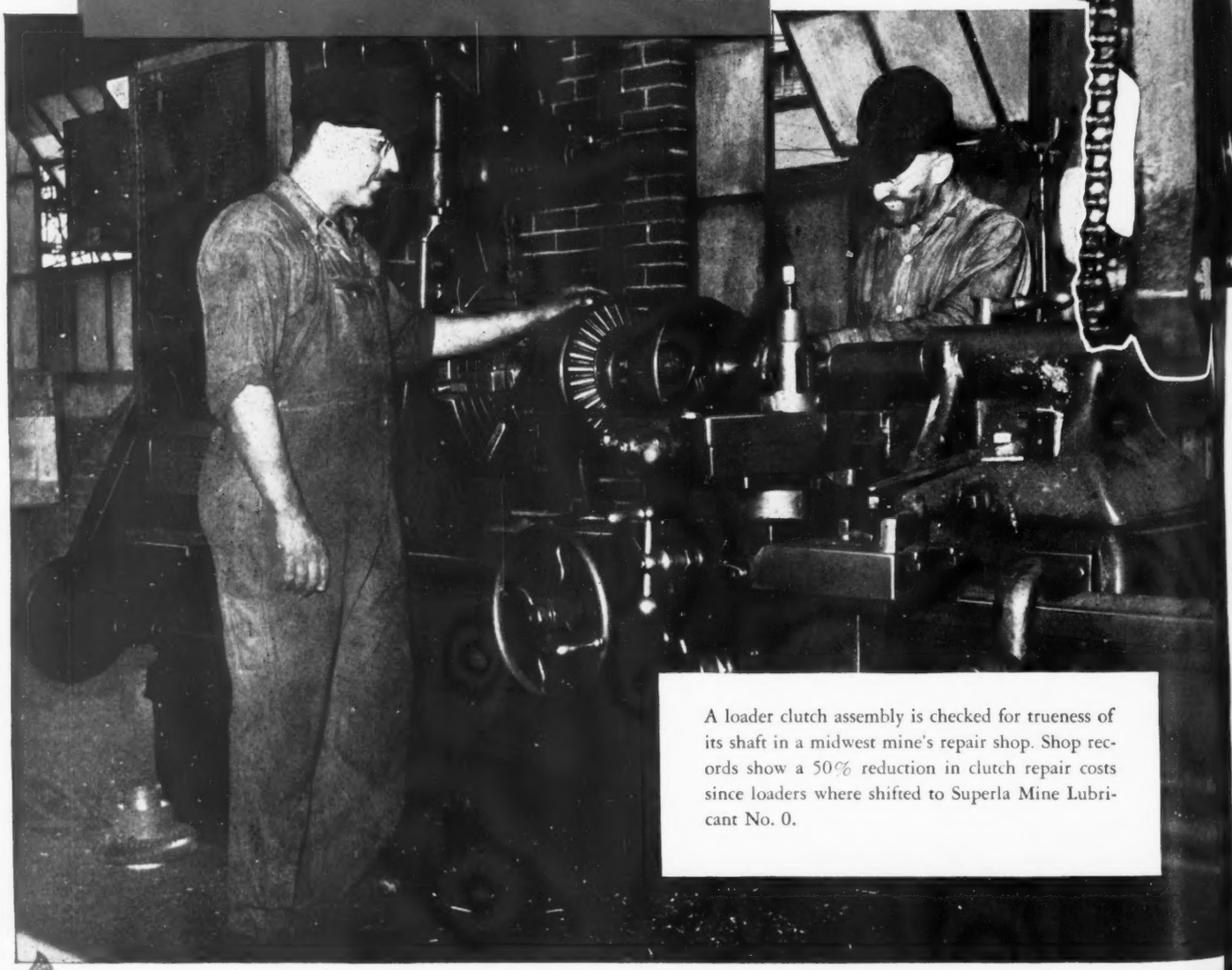
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY-SULLIVAN OF CANADA, LIMITED, GALT, ONTARIO

Here's VISIBLE EVIDENCE . . .

SUPERLA
Mine Lubricant No. 0

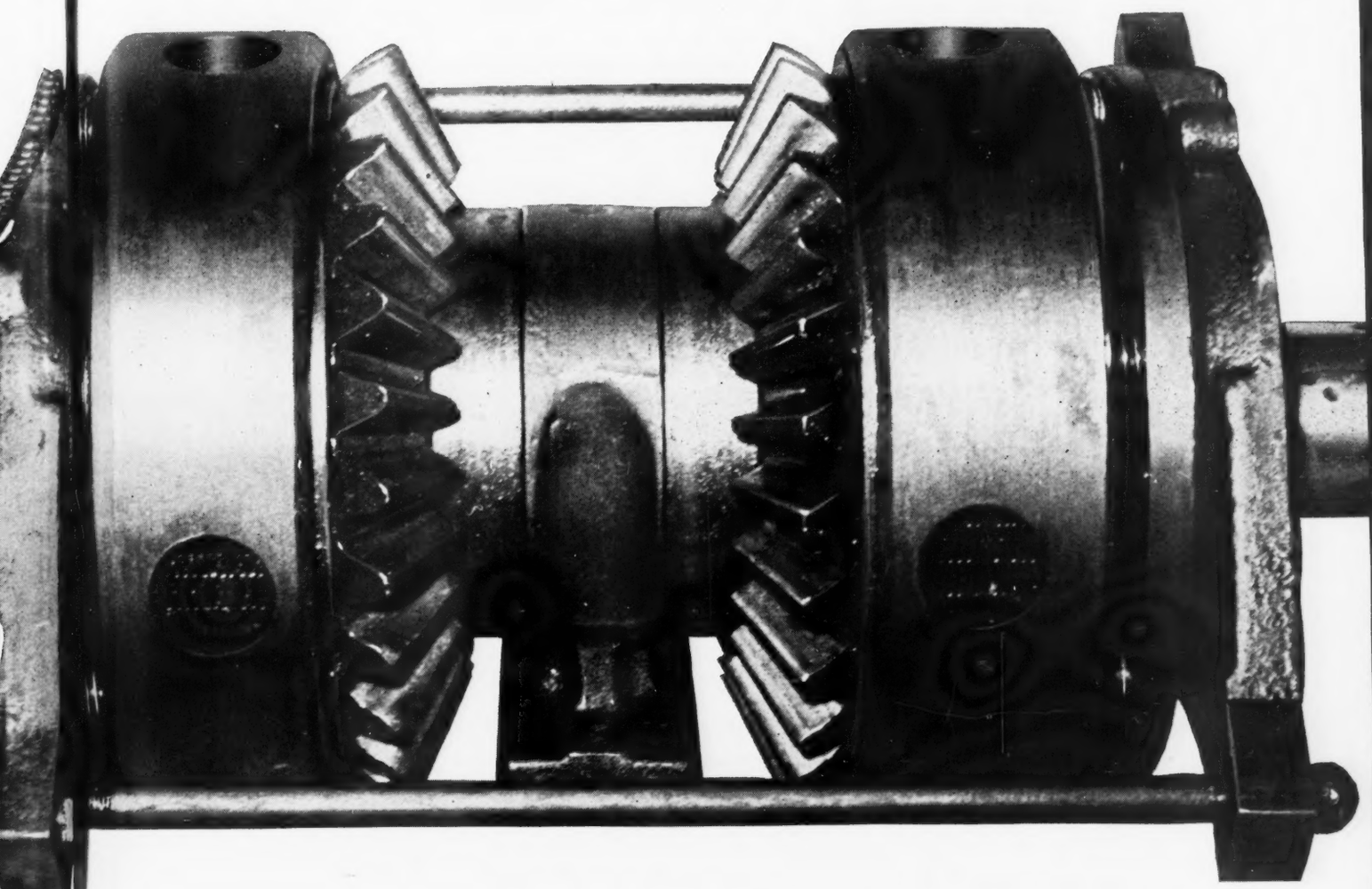


A loader clutch assembly is checked for trueness of its shaft in a midwest mine's repair shop. Shop records show a 50% reduction in clutch repair costs since loaders where shifted to Superla Mine Lubricant No. 0.

STANDARD

STANDARD OIL COMPANY (INDIANA)

. . . of better loader lubrication.



This clutch assembly, from a Goodman loader in a midwest mine, has seen 23 months' hard service. The unit has not been cleaned; nevertheless, it is completely free of sludge and deposits. The clutch plates are clear of carbon. Here is visible evidence of the superior lubrication provided by Superla Mine Lubricant No. 0.

What benefits resulted from this cleaner and safer lubrication? Loaders stayed on the job longer, loading out high tonnage for this mine. Clutch operation was efficient and dependable—machines were easy to handle. Clutch repair costs were reduced by more than 50%.

You can look forward to improved loader operation and lower maintenance costs by shifting, now, to Superla Mine Lubricants. Grades are available for both grease- and oil-lubricated cutters and loaders. If your mine is located in the Midwest, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the services of the Standard Oil Lubrication Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD

Ever see a pump any EASIER to install?

THE *Electrifugal* PUMP

IT'S A "PACKAGE" — a complete, low-cost pumping unit that meets a wide range of requirements. It can be installed in any position, and fits easily into limited space.

DRIP-PROOF MOTOR — Allis-Chalmers Lo-Maintenance design, specially built for pumping service. Stator core and windings may be replaced as a unit.

DEPENDABLE PUMP — with such long-service features as bronze wearing rings, generous packing, improved plastic water seal.

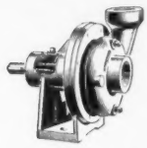
EASY MAINTENANCE Pump can be taken apart readily for inspection and replacement of packings or wearing rings, when necessary.

Many Sizes Now Available

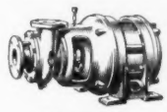
ELECTRIFUGAL PUMPS are made in capacities from 15 to 1400 gpm, and heads to 500 ft. Many of these sizes are now in stock. Also available are some sizes of PEDRIFUGAL and SS UNIT pumps. If you need small pumps NOW, phone or wire your nearest A-C office or dealer for latest stock and delivery information.

And for general information on the complete A-C line of centrifugal pumps, up to 600,000 gpm, ask for Bulletin B6059D.

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS. A 2383



PEDRIFUGAL
The new A-C pump for flexible Texrope V-belt drive. Capacities to 500 gpm, heads to 100 ft.



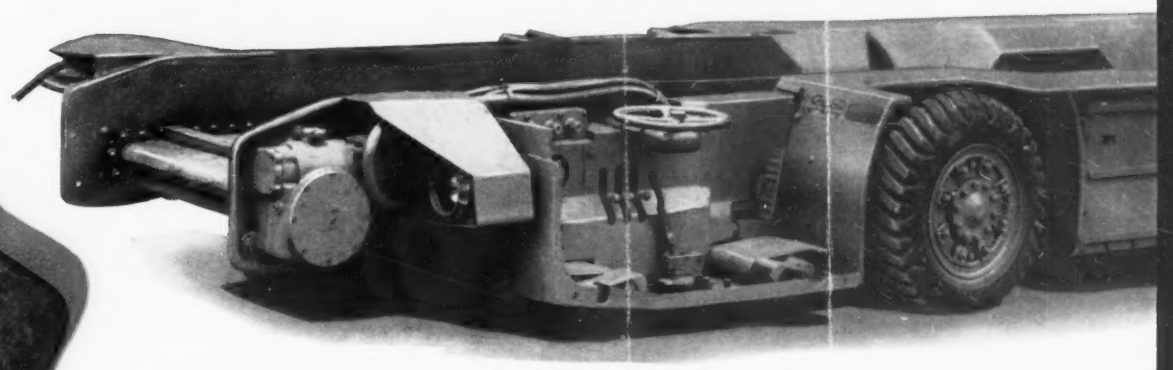
SS UNITS
Close-coupled pump and motor units, made in 234 standard ratings, to 2500 gpm.

Electrifugal, Pedrifugal, SS Unit and Texrope are Allis-Chalmers Trademarks.

ALLIS-CHALMERS

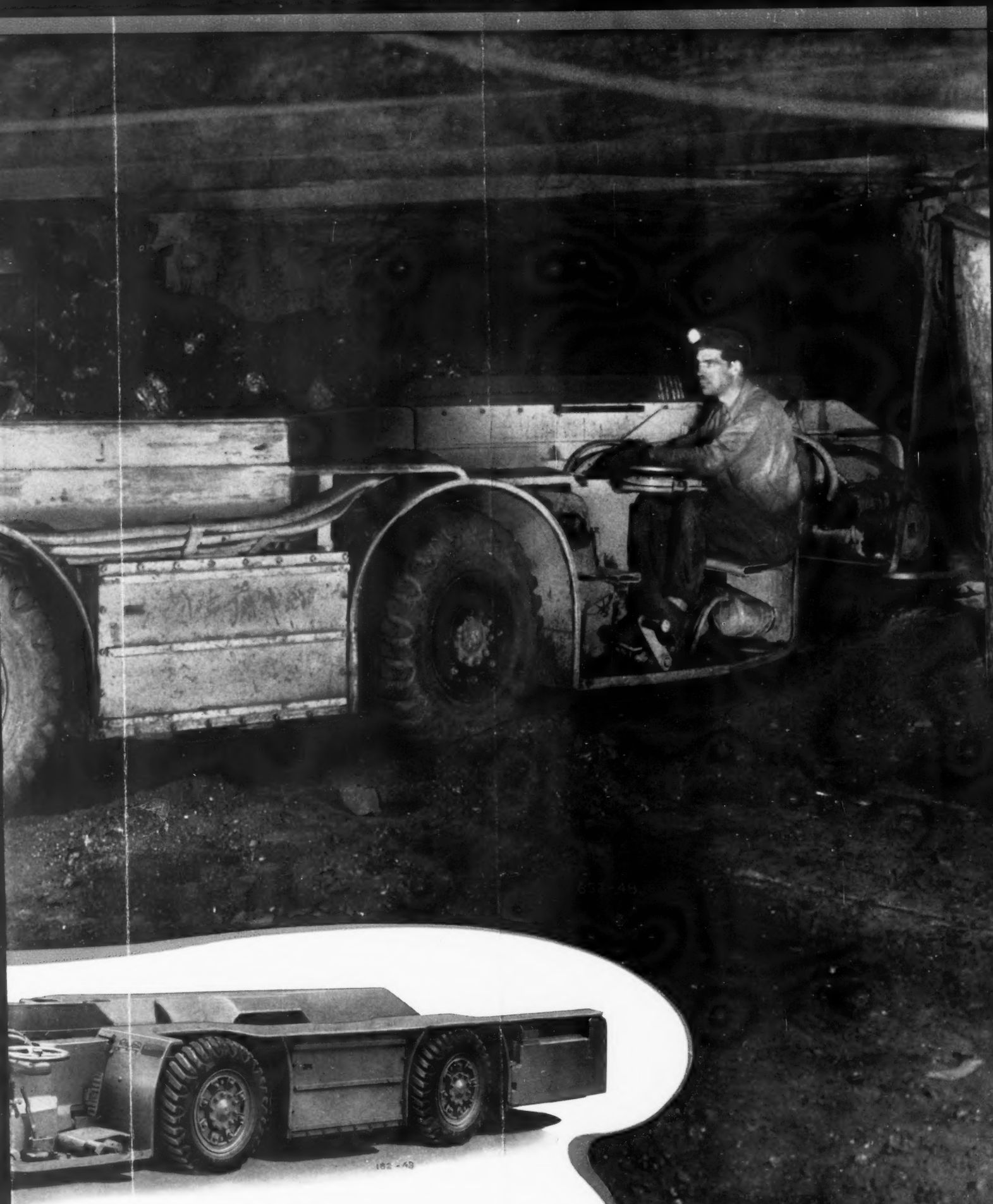
One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

Above – Installation view of a high type Jeffrey Shuttle Car being loaded by mechanical loader.



● A low type Jeffrey Shuttle Car equipped with four wheel drive, four wheel hydraulic steering and elevating discharge, for service in low vein mines.

Drives on Jeffrey Shut
truck type consisting
mounted spiral, bevel a
in oil in completely se



ar equipped
el hydraulic
or service in

Drives on Jeffrey Shuttle Cars are of the heavy truck type consisting of anti-friction bearing mounted spiral, bevel and helical gears operating in oil in completely sealed cases.

J

JEFFREY SHUTTLE CARS

Loading end view of high type Jeffrey Shuttle Car showing large carrying capacity.

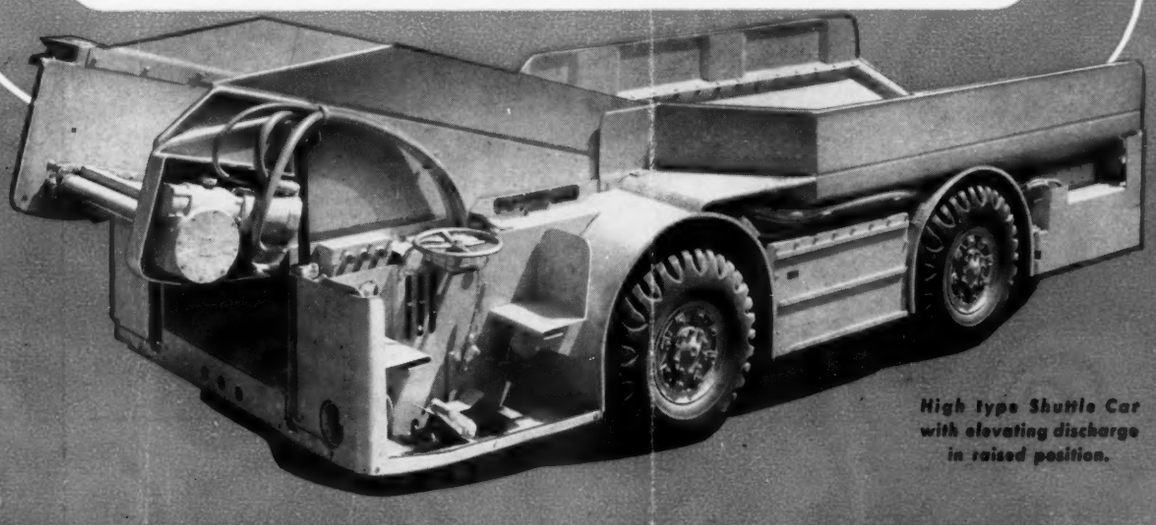
Jeffrey Class 65 Cable Reel Shuttle Cars are built in three sizes, 30″, 35″ and 43″, with removable side boards being available for additional height and capacity.

All three sizes can be furnished with either four wheel drive and four wheel steering, or with two wheel drive and two wheel steering.

Four wheel drive cars have separate motor drives for front and rear wheels, a feature which results in equal loading of the traction motors.

Conveyor on all sizes is driven by hydraulic motor with variable speed control.

Steering, brakes, cable reel and elevating discharge are all hydraulically controlled, insuring quick and easy operation.



High type Shuttle Car with elevating discharge in raised position.

LOADIN

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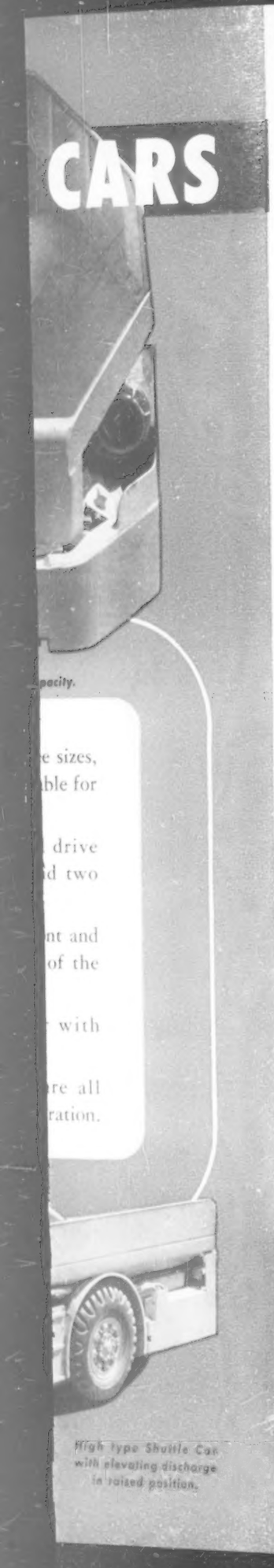
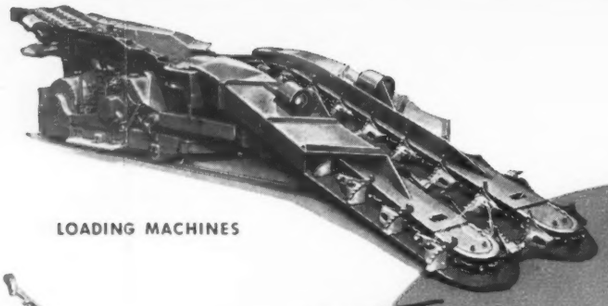
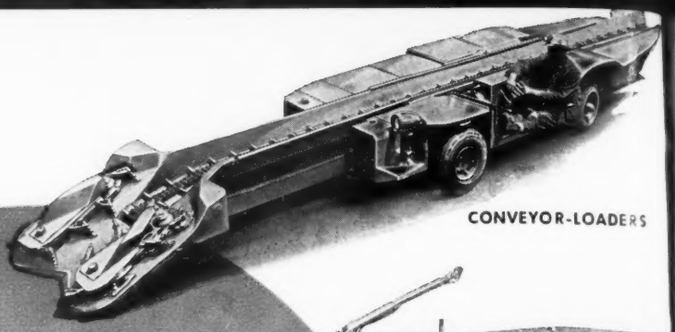


High type Shuttle Car with elevating discharge in raised position.



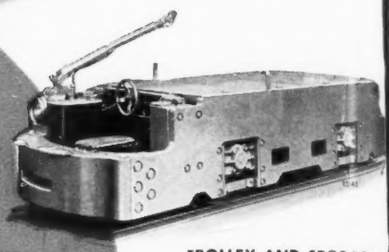
LOADING MACHINES



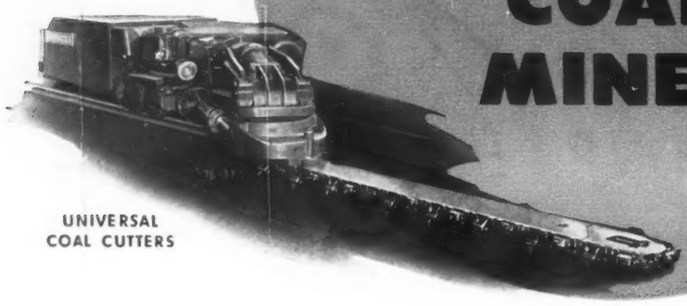
CONVEYOR-LOADERS

DRILLS AND DRILLING MACHINES

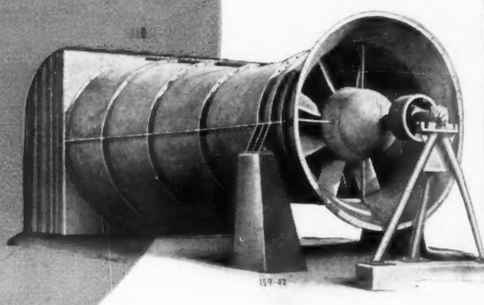
JEFFREY EQUIPMENT FOR COAL MINES



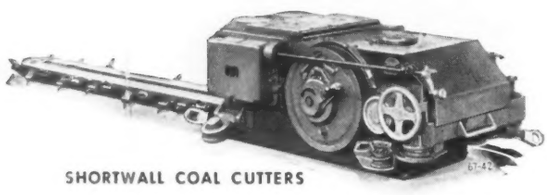
TROLLEY AND STORAGE BATTERY LOCOMOTIVES



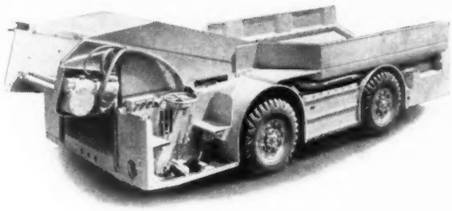
UNIVERSAL COAL CUTTERS



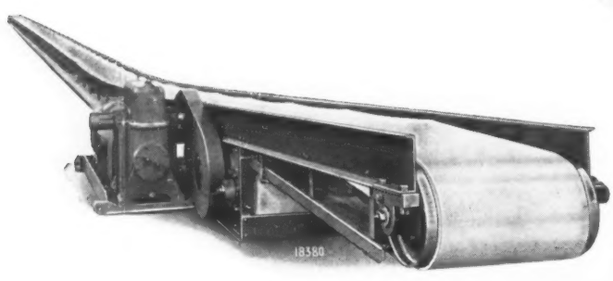
FANS AND BLOWERS

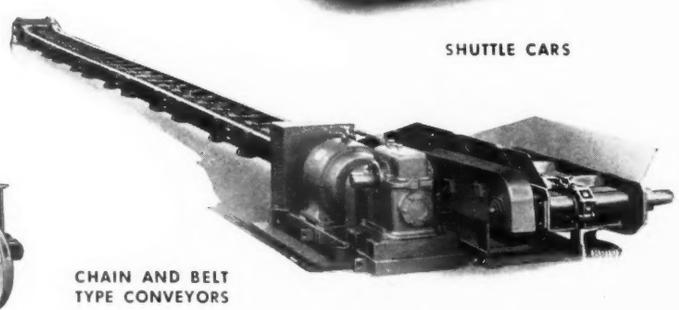


SHORTWALL COAL CUTTERS



SHUTTLE CARS





CHAIN AND BELT TYPE CONVEYORS

AND GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Jacksonville, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

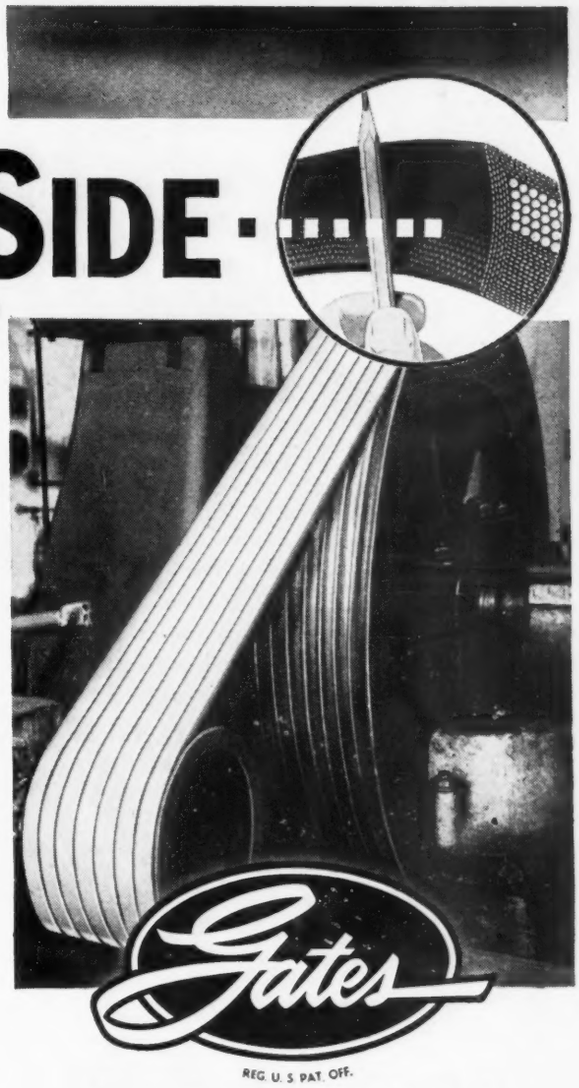
Service Stations: Pittsburgh, Harlan, Ky., Birmingham, Mt. Vernon, Ill., Logan-Beckley, W. Va., Scranton

Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond Ltd., Wakefield, England; Jeffrey-Galion (Pty), Ltd., Johannesburg, S. A.

Here is **WHY** *the*

CONCAVE SIDE

(U. S. PATENT NO. 1813698)



SAVES You Many DOLLARS In V-BELT Costs!

Every time a V-Belt bends around its pulley, the *top* of the belt is under *tension* and grows *narrower*. The *body* of the belt is *compressed*—causing the *sides* to *bulge out!*

FIG. 1

Because of these stresses, any V-Belt built with straight sides is forced to assume, in the sheave groove, the shape shown in figure 1, on the left.

This forced bulging of a *straight-sided* V-Belt against the sheave groove walls naturally produces excessive wear along the *middle* of the belt's sides—as indicated by the arrows. Also, because the full side of the belt does not *uniformly* grip the pulley, there is a definite loss in drive efficiency.

Now see the difference when you bend the V-Belt that is built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

FIG. 2

As the Gates Vulco Rope bends, its Concave Side becomes straight (Figure 2). It exactly fits the sheave groove—and this gives you two very definite savings:—

(1) No out-bulge of the sides means uniform side-wall wear—*longer life!*

(2) *Full side-width* grip on the pulley carries heavier loads and sudden load increases without slippage—saving your belts and saving power too!

The Mark of SPECIALIZED Research

The Concave Side is MORE IMPORTANT NOW Than Ever Before!

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates SPECIALIZED Research has made available to you *SUPER* Vulco Ropes —carrying fully 40% higher horsepower ratings —the life-prolonging Concave Side naturally delivers greater savings today than ever before.

4810

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.
"The World's Largest Makers of V-Belts"

Cutter Speed up 88%

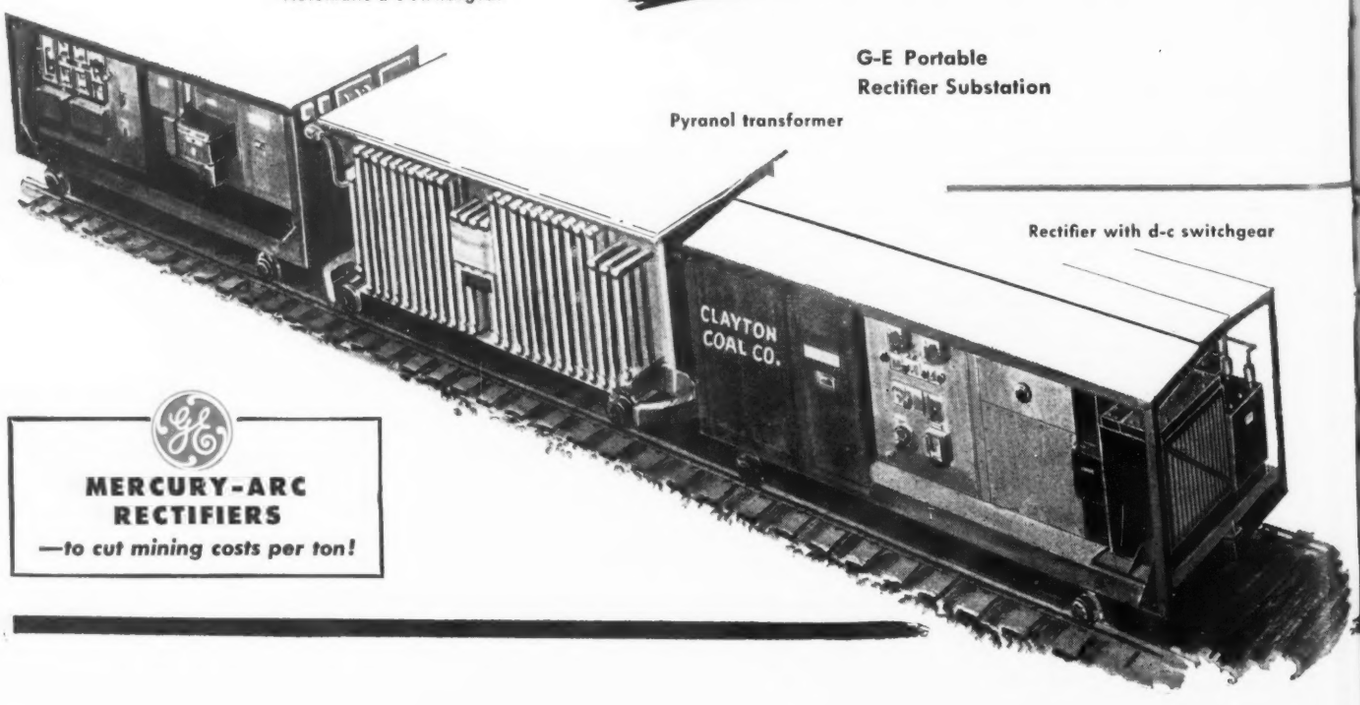
Hauling Time down 33%

Automatic a-c switchgear

G-E Portable Rectifier Substation

Pyranol transformer

Rectifier with d-c switchgear



MERCURY-ARC RECTIFIERS

—to cut mining costs per ton!

G-E Portable Mercury-Arc Rectifier gives this Colorado mine operator higher working voltage at the face—more efficient mining machinery operation—higher output per shift.

At the Clayton Coal Company's Washington Mine, with a voltage of 190 v at the working face, coal cutter speed used to be 17 inches per minute. A round trip for a loaded car took 12 minutes.

Now, with the working voltage raised to 275 v, coal cutter speed averages 32 inches per minute—*a jump of 88%*. Round trips for the same number of loaded cars take 8 minutes—cutting *one-third off* the former time. Here's how it was done:

Early in 1946, a 200-kw G-E portable sealed-ignitron mercury-arc rectifier was delivered to the mine entrance and moved easily on the haulageway tracks to a position near the cutting face. A-c and d-c connections were made quickly and simply, putting 275 volts of d-c power near the cutting face. This completed the installation.

The G-E rectifier has cut over-all mining cost per ton with these definite improvements:

MORE EFFICIENT OPERATION—because voltage at all underground electrical equipment is held to close limits and power continuity is assured even during peak load periods.

LOWER LINE LOSSES—because the d-c power is transmitted over shorter distances to the working area, making ample power available right where it's needed.

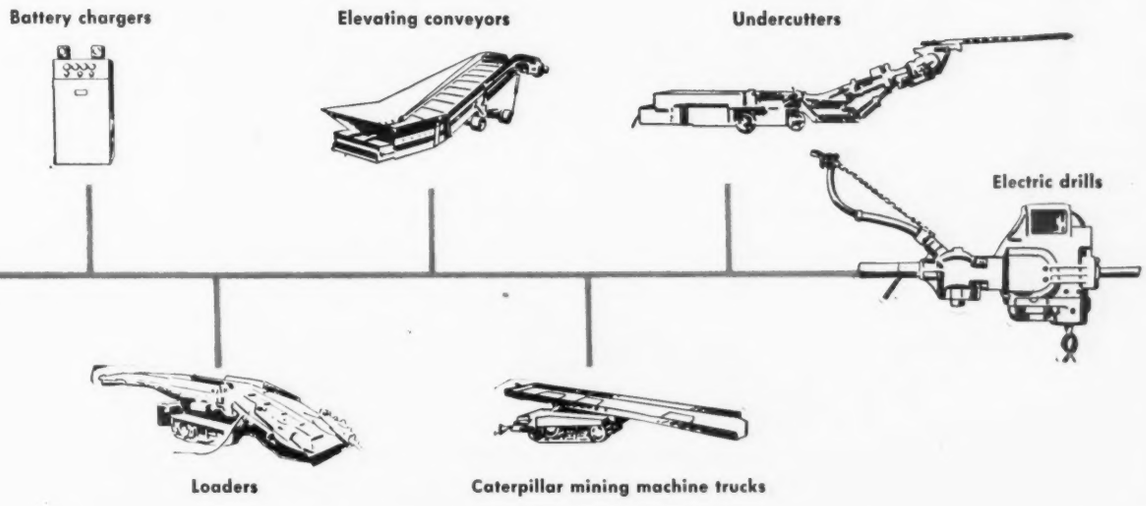
In fact, this mine operator, who is one of the largest in the northern Colorado field, says the rectifier equipment paid for itself in a year with greater production at lower cost.

Have you looked into the cost-reducing possibilities of a G-E mercury-arc rectifier for your underground mining operation? Get the facts now. Call or write our nearest office for Bulletin GEA-4047. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

G-E PORTABLE MERCURY-ARC RECTIFIERS provide these worthwhile advantages for underground applications:

1. Enclosed for greater personnel safety
2. Highly portable close to the working face
3. Low-height design for use in thin seams
4. Wide range of available ratings
5. High conversion efficiency in all ratings
6. Low maintenance costs
7. Long, continuous service

Schematic diagram below shows how the G-E portable mercury-arc rectifier substation serves mining machinery in the Washington Mine of the Clayton Coal Company.



GENERAL ELECTRIC

UNION PACIFIC

The Governor of Montana *invites You*

State of Montana
Office of The Governor
Helena

SAM C. FORD
GOVERNOR

To American Industry:

Montana has developed only the most obvious of its many resources in the agricultural, lumbering and extractive industries.

Our state agencies, industrialists and businessmen, working through the Industrial Development Division of the Montana Chamber of Commerce, are ready to help prospective industries. We have prepared for your inspection exhaustive briefs on the following: Coal Chemicals, Plywood, Pulpwood, Wool Processing, Chinaware, Phosphates, Traverstine, Corundum, Oil By-products, Paint Pigments and Metal Fabrication.

Outstanding advantages are low-cost Hydro-electric Power, Natural Gas and Coal, intelligent labor, superb natural surroundings, an invigorating climate and a relaxed, Western way of life.

On behalf of my fellow Montanans, you are invited to make this pleasant land—the Treasure State—your home and your future.

Cordially yours,

Sam C. Ford

Governor

Sam C. Ford

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

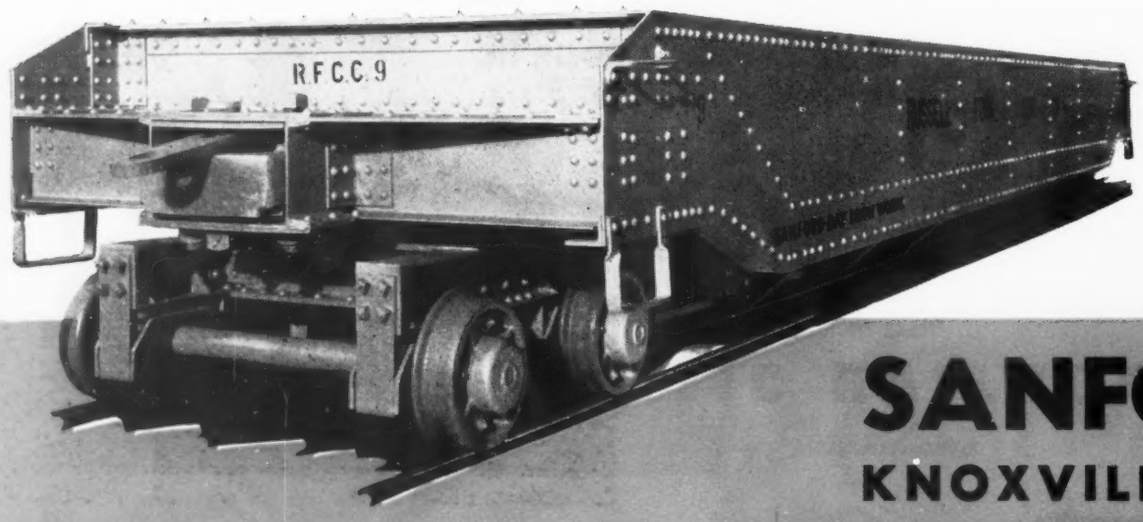
It costs less to operate a pump that delivers continuous trouble free performance 24 hours a day, for weeks and months on end...That's why WILFLEY pumps rank so high in the estimation of plant operators who like to keep costs down and production up. Exclusive principles of design and construction, based on many years of pioneering and research in the field, keep WILFLEY out in front and make it the pump to buy when you want cost-saving performance. Heavy pumping parts of rubber, alloy iron, alloy steel—whatever material best suits your job... Individual engineering on every application. Write or wire for details.

A. R. WILFLEY & SONS, INC.
DENVER, COLORADO, U. S. A.
New York Office: 1775 Broadway, New York City

Another "FIRST" By SANFORD-DAY...

60 Thousand Pounds of Coal PER CAR

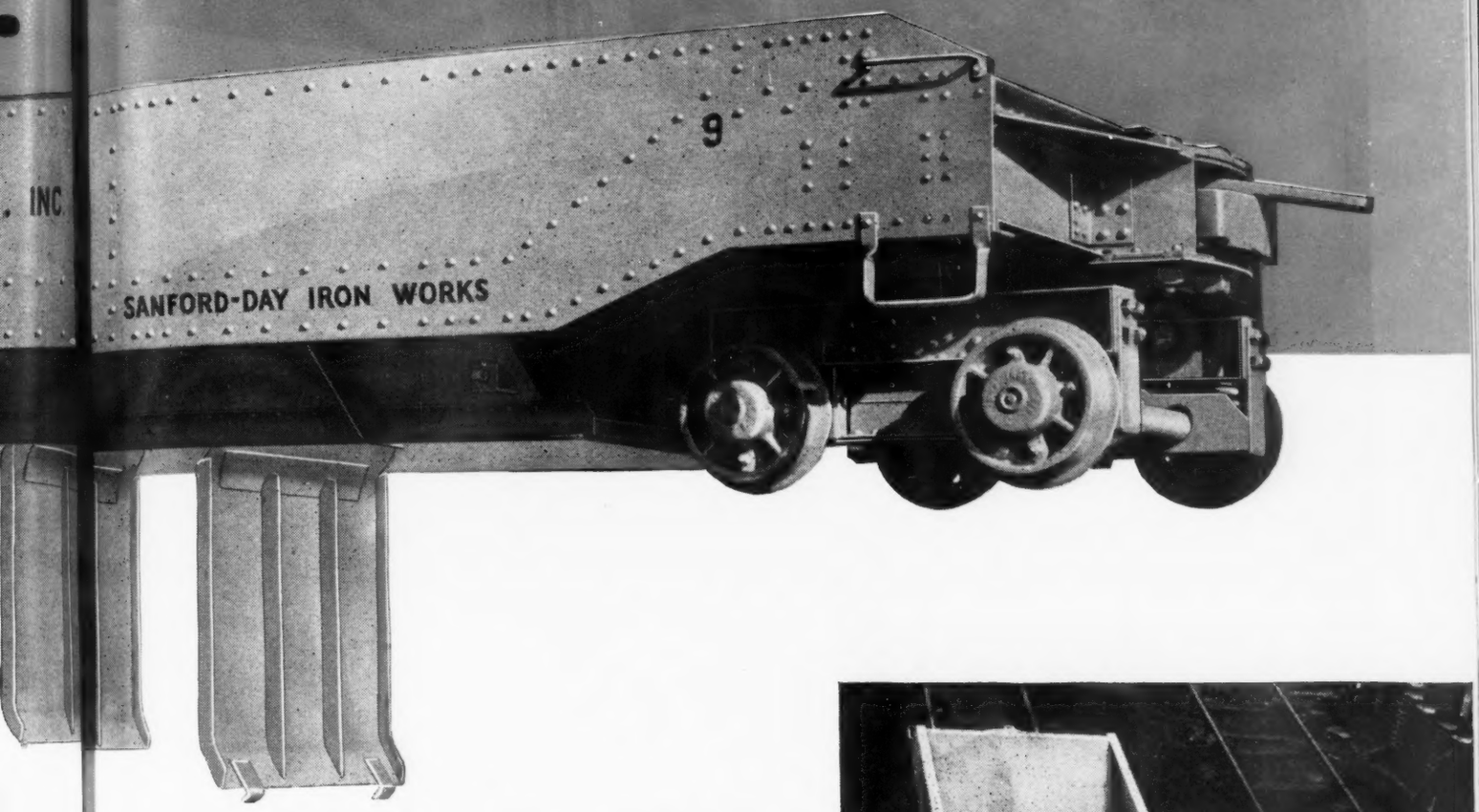
This is the largest automatic bottom-dumping car ever built for conventional coal mine use. It is one of the cars designed and built for the Russell Fork Coal Co. Its length is 39 ft. 8 in.; Width 8 ft.; Height 4 ft. 4 in. above track and, bear in mind, it rides on eight S-D "FLOATER" BALL BEARING DEMOUNTABLE WHEELS. THIRTY TONS OF COAL, including surcharge, pass through its six doors almost instantly, when doors are tripped. The doors are provided with two sets of latch hooks—one set for each three doors. This *extraordinary safety feature* is made possible by our new improved "Jerk-out" latch and tripping device. The "Jerk-out" works entirely under the car with foolproof, *safe* operation.



SANFORD-

KNOXVILLE,

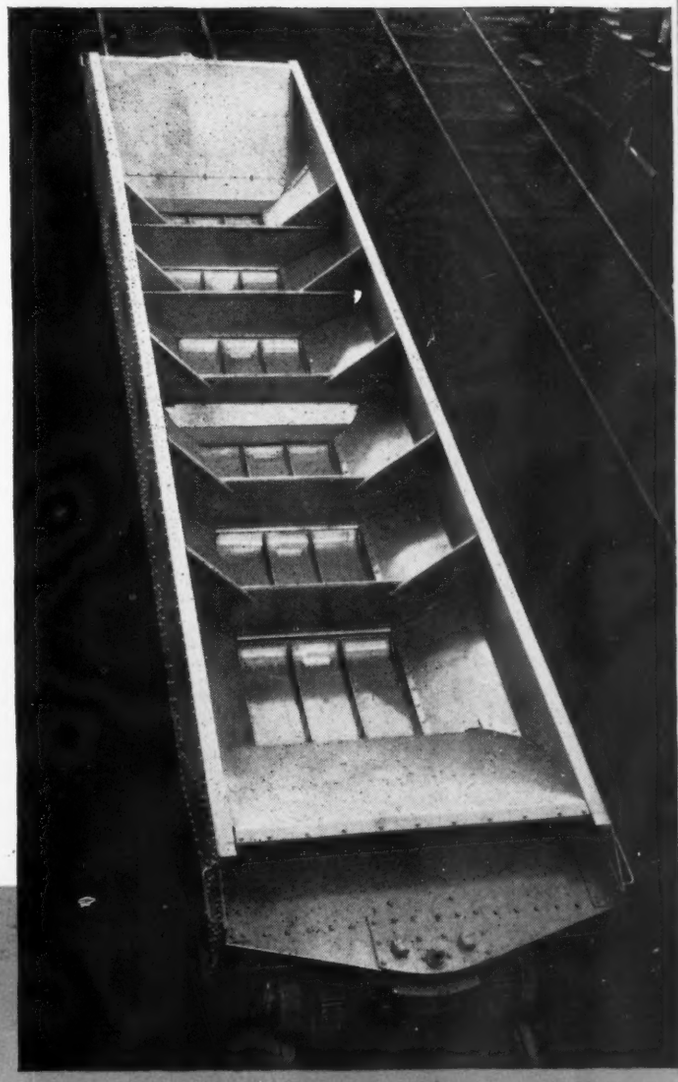
The Largest Automatic Bottom-Dumping Car Ever Built For Regular Coal Mine Use



Stop And Think—"Can Your Mine Use 30-Ton Cars?"

Increased production at the least possible cost is vital today. This is a well known fact you already know. Not every mine, of course, can use a car of this capacity. However, many operators are overlooking the great economies offered by BIG S-D "Automatics". The trend is to larger cars. Many mines are seriously studying the possibility of using them. We will be glad to discuss the details with you without obligation.

If any change-over is planned in your mine, you will profit tremendously by changing over to the industry's most modern and efficient car—the S-D Automatic Bottom-Dumping Car . . . built to meet your particular requirements, large or small.

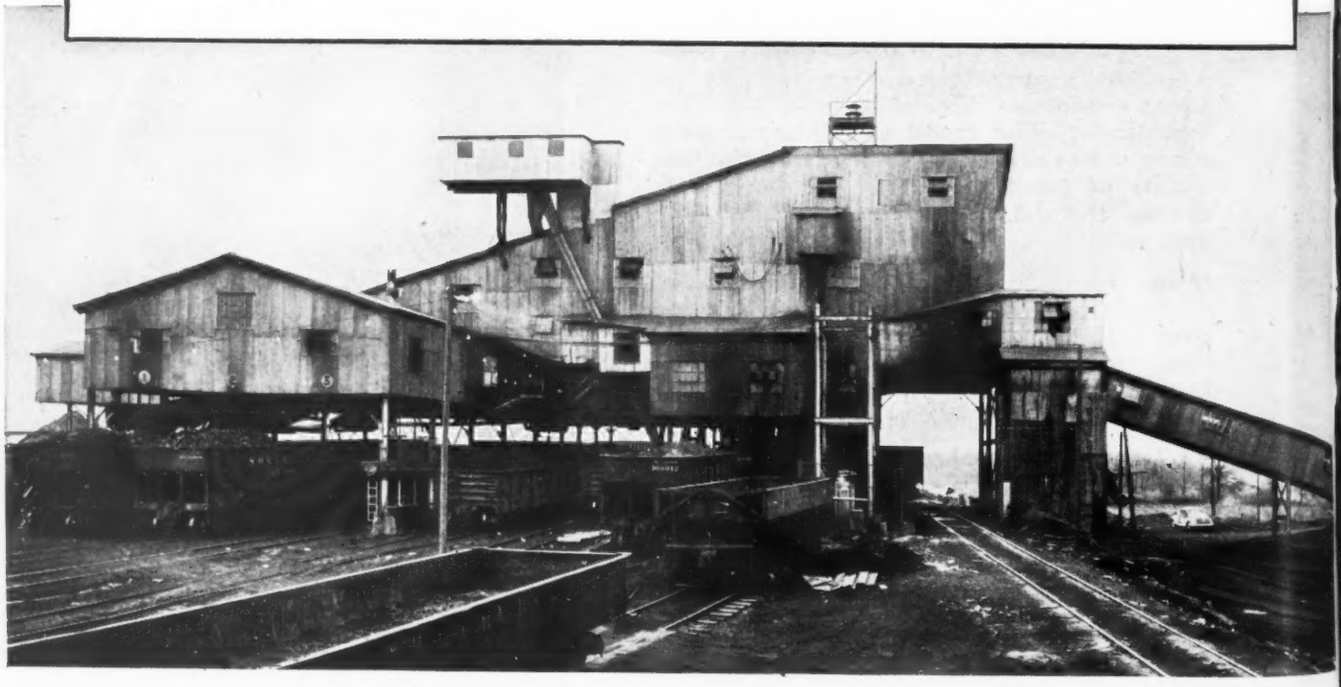


DAY Iron Works

TENNESSEE

This 42" U. S. Matchless Conveyor Belt carries run-of-mine bituminous coal from hopper to preparation plant.

Below is tipple of the same mine. U. S. Conveyor Belting has been used exclusively since erection of tipple.



COST PER TON

Low cost haulage always results when your mining engineer, your equipment engineer and the U. S. Rubber Belt Engineer *work together* on your problem. This system of Coordinated Engineering has been used by many Mine Operators in their mechanization programs, big and small. May we talk it over with you?

Write Mechanical Goods Division, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

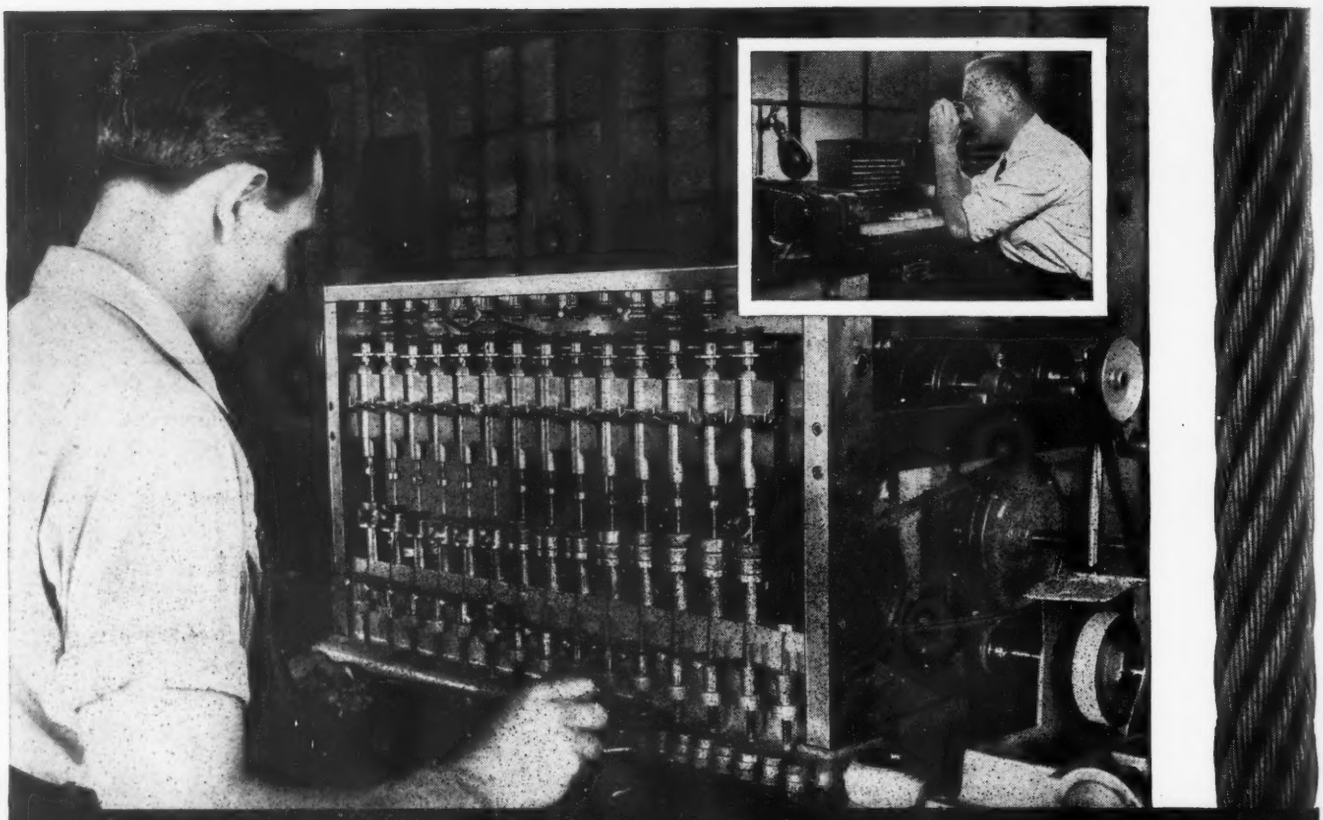
Underground belts as well as slopes are important in the plan of coordinated three-way engineering advocated by U. S. Rubber.

PRODUCT OF

U.S.RUBBER

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY



These 'Drill Masters' Develop Precision in Wickwire Rope

The workability and durability of wire rope is largely dependent upon accurate coordination of each wire in the rope. Because off-size wire can cause excessive friction and internal rope wear and early failure in service, every wire must be perfect in shape to fit into the exact geometric construction pattern of the rope.

Knowing this requirement—and knowing *how* to meet it—rests to a large extent with the men in the Die Department at Wickwire. These skilled craftsmen are perfectionists gifted with a passion for accuracy. Using special precision machines (some designed by men in the department), these patient, keen-eyed 'drill masters' create wire drawing dies drilled and ground to an accuracy within .0003 of an inch.

Such scientific precision characterizes every step in Wickwire Rope production. Small wonder then, that it is the choice of those who demand the utmost in performance, safety and long life. You can depend upon Wickwire Distributors and Rope Engineers for practical help in solving your wire rope problems. See your local Wickwire Distributor for Wickwire Rope in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write —Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

WICKWIRE ROPE

CF&I & SUBSIDIARIES

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

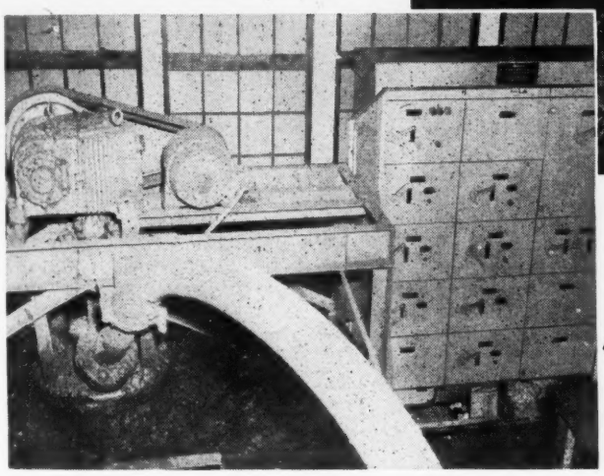
WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass. **EXECUTIVE OFFICE**—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Philadelphia • Tulsa • Fort Worth • Houston • New York

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

Now! WKE (HMS) "MOBIL-MILL"

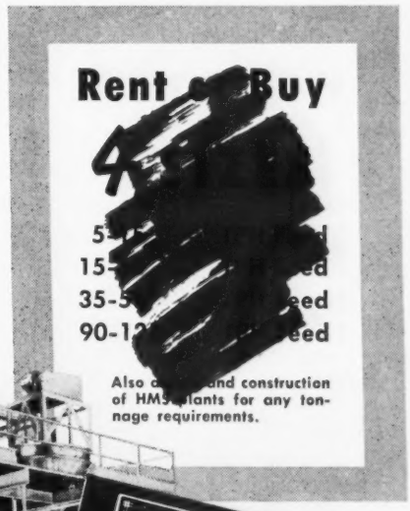
a complete, prefabricated coal cleaning PLANT



Interior view of "Mobil-Mill" section showing final washed coal and refuse materials being discharged from heavy medium drainage washing screen.

Section of "Mobil-Mill" illustrating heavy medium separation vessel in foreground for production of separate coal and refuse products. Note centralized electrical control panel at right.

Ideally suited for production of low-ash coal products and elimination of refuse, "Mobil-Mills" are prefabricated for quick, economical installation. Now operating as complete cleaning units, these packaged plants easily fit into the breaker flow diagram between the breaker crushing circuit and the product disposal section. Sharp, closely controlled separations are effected by using magnetite as a heavy medium. Investigate this low-cost machine for efficient coal cleaning.

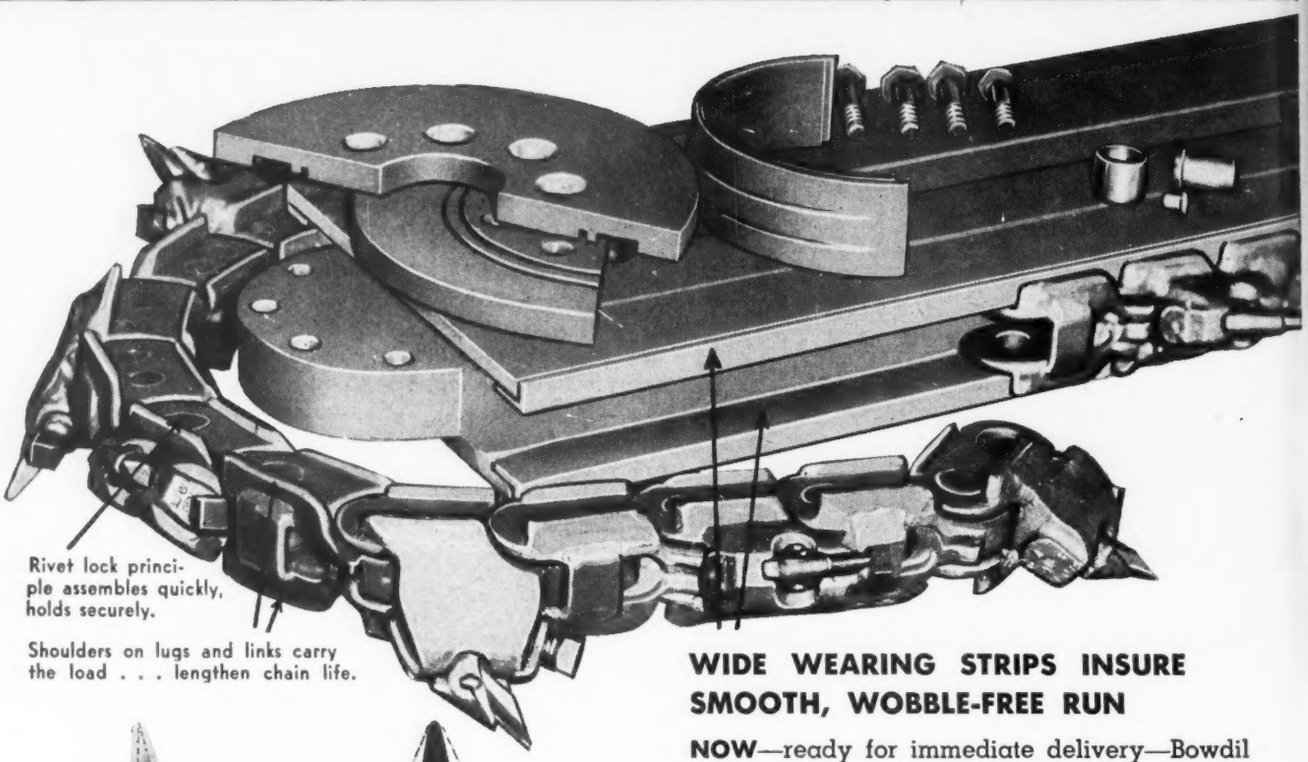


Write WEMCO for details of coal cleaning economies now possible with "Mobil-Mill."

LOS ANGELES • SACRAMENTO • SALT LAKE CITY • SPOKANE • POCATELLO, IDA. • DENVER • PHOENIX • CHICAGO • HIBBING • BARTOW, FLA. • NEW YORK

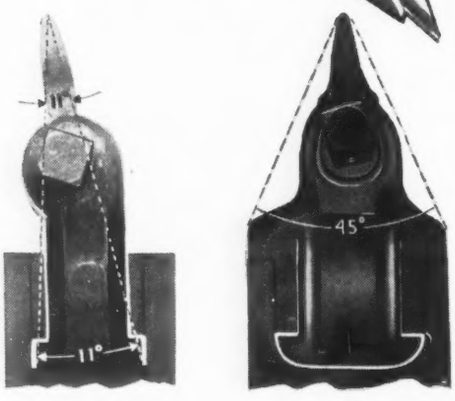
Coal Spirals • "S-N" Classifiers • Thickeners • Conditioners • Agitators • HMS Separatory Vessels • HMS Sand Pumps • HMS Thickeners • HMS Densifiers • WKE (HMS) "Mobil-Mills" • HMS Medium Pumps

Time and Money-Saving Features OF BOWDIL FABRI-FORGED CUTTER BARS AND CHAINS



Rivet lock principle assembles quickly, holds securely.

Shoulders on lugs and links carry the load . . . lengthen chain life.



CONVENTIONAL BOWDIL

Write for complete information contained in Bowdil's folder "Another Step Ahead." We will be glad to present cost saving facts.

WIDE WEARING STRIPS INSURE SMOOTH, WOBBLE-FREE RUN

NOW—ready for immediate delivery—Bowdil presents advanced equipment to meet modern needs economically. The shoulders on the lugs and links, plus the wider wearing strips on the bar greatly speed and improve cutting operations by:

1. Increasing bearing surfaces
2. Reducing leverages over ½
3. Stabilizing deflection

With Bowdil's famous Concave Cutter Bits in the holders, this equipment will definitely prove operating economy for you.

BOWDIL

COAL CUTTING EQUIPMENT

CANTON OHIO

Pull Timbers

THE FAST · SAFE · LOW-COST WAY!

JOY

POST PULLER

...Highly Efficient!

The JOY Post Puller has established itself as the outstanding unit for safe, fast, low-cost timber recovery. An extremely powerful machine with a 20,000 lb. dislodging pull, it is equipped with a hydraulic roof jack and powerful brakes. This efficient JOY unit can also be used as a room hoist or car hauler, and may be equipped with bulldozer blade for shuttle-car roadway maintenance. It is only 32½" high for work in thin seams, and available either with caterpillar or track mounting. Write for Bulletin.

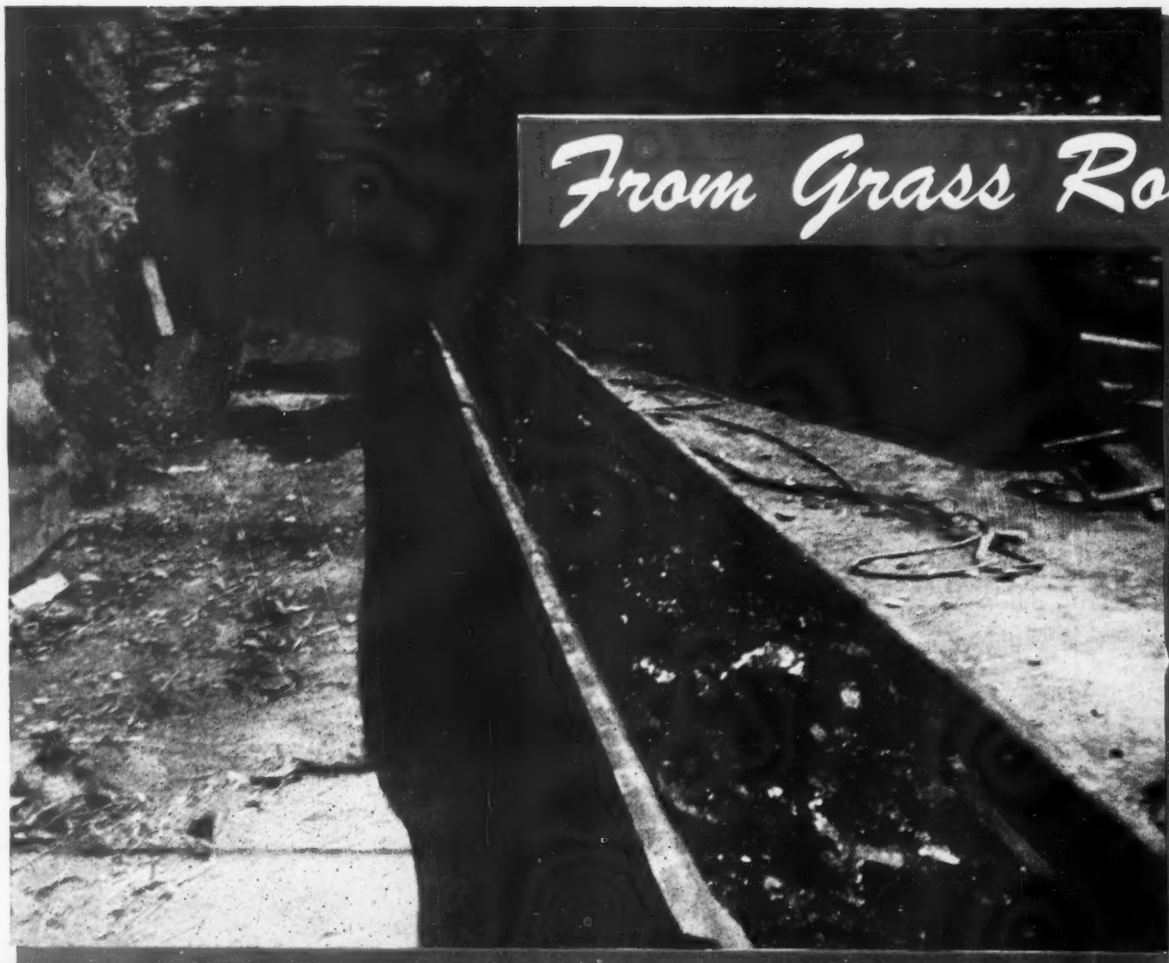
Consult a Joy Engineer

W&D CL 2061

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY-SULLIVAN OF CANADA, LIMITED, GALT, ONTARIO



From Grass Roots

The Duckbill-Shaker Conveyor has an extremely low maintenance cost. Two types of Duckbill units are available — the fully automatic, the power controlled.

GOODMAN MANUFACTURING COMPANY

to Full Production WITH

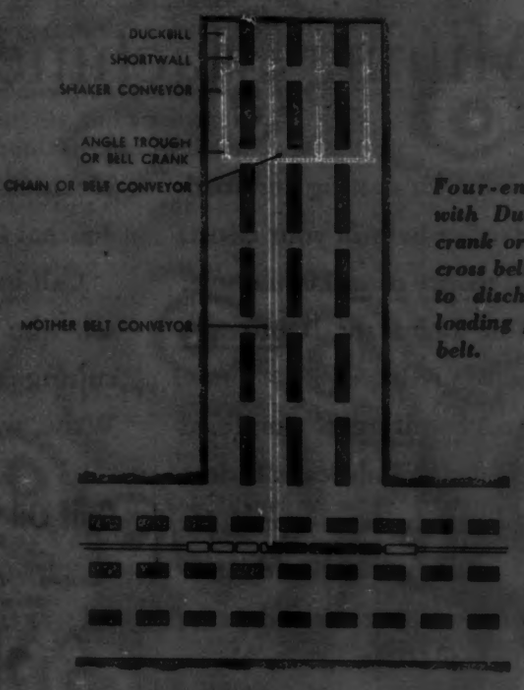
GOODMAN DUCKBILL-SHAKER CONVEYORS

From the day the drift opening of this mine was started and on up to the full production of today, Goodman Duckbill-Shakers have been on the job.

The single unit installed to drive the main entry was quickly increased to 4 for semi-production work of driving room entries and later multiplied to 20 complete units for full production in rooms.

The routine was simple and organized in every application. In the development work, waste was deposited at desirable spots for fill and grade; in semi-production the advance of room entries was fast with the work being done at a profit; and in full production there has been maintained the closest possible approach to a continuous flow of coal from face to entry. It's another outstanding example of the versatility of Goodman Duckbill-Shakers.

The installation referred to here is another profitable application of Duckbill-Shaker Conveyors. It is one from a bulging file of case histories that cover small mines, large producers, common conditions, and special problems that had no profitable solution with other equipment. A Goodman sales engineer will be glad to offer details of this method of mining and help determine how it can be put to work for you.



Four-entry development with Duckbills using bell crank or angle trough and cross belt or chain conveyor to discharge at common loading point onto mother belt.

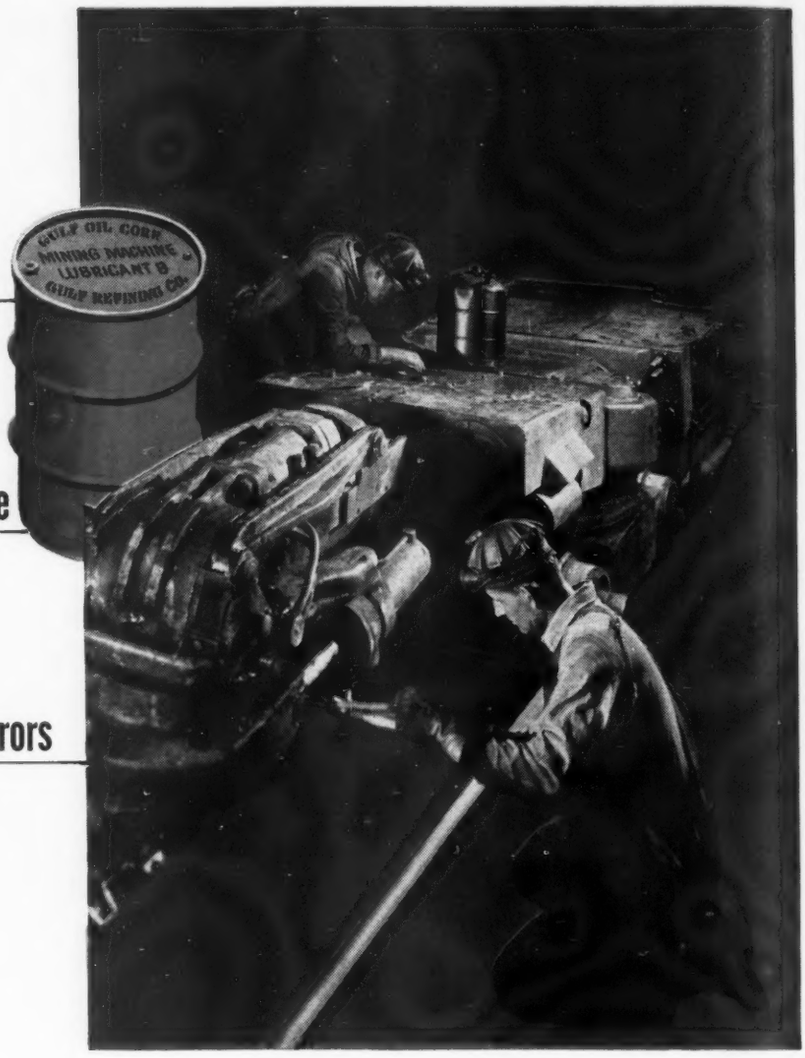
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England: UNITED STEEL COMPANIES, LTD.

Save on maintenance costs

Simplify lubricant storage and handling

Eliminate application errors at the face



with

Gulf Mining Machine Lubricant B

This outstanding lubricant for cutting and loading machines offers effective help in your efforts to increase tonnage and reduce costs. Here's how:

Gulf Mining Machine Lubricant B provides better lubrication—wear is reduced.

Lubricant storage and handling is simplified because Gulf Mining Machine Lubricant B does the job of two or three other lubricants—provides effective lubrication for both plain and anti-friction bearings and for gears in drives and transmissions.

Application errors are avoided at the face because in most cases you need only Gulf Mining Machine Lubricant B and a hydraulic oil—Gulf Journal Oil.

Call in a Gulf Lubrication Engineer today and ask him to demonstrate the time-saving, cost-cutting advantages of this quality lubricant. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

GULF INDUSTRIAL LUBRICATION

What He Says about KINKING

One of the quickest ways to ruin a wire rope is to let it kink. That, says the Bethlehem engineer, is certain death for the rope. Even though your eye may detect no damage . . . it's been done. for kinking throws wires and strands out of harmonious balance; leads to spot wear and wire breakage long before the rope has lived its normal life.

Improper unreeling is a common cause of destructive kinking. Never lay the reel on its side without a turntable and attempt to lift off the rope. That's just asking for trouble. Instead, jack up the reel so that it revolves freely; then, while one man "brakes" the reel, another should slowly pull off the rope in a straight line.

Be careful, too, when handling a *coil* of rope—one not wound on a reel. Merely grabbing the rope and starting to pull will invariably produce damaging loops and kinks. To uncoil, place the end of the rope on the ground, then roll the coil like a hoop, in as straight a line as possible.

The Bethlehem field engineer will gladly give any helpful pointers on the proper way to unreel and uncoil wire rope. It's something *every* user of rope should know.

Remember, there's no charge for the services of the Bethlehem representative, no matter how much time he spends with you. It's his job to help you in selecting wire rope and getting the best service from it. Feel free to call him on any wire-rope problem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

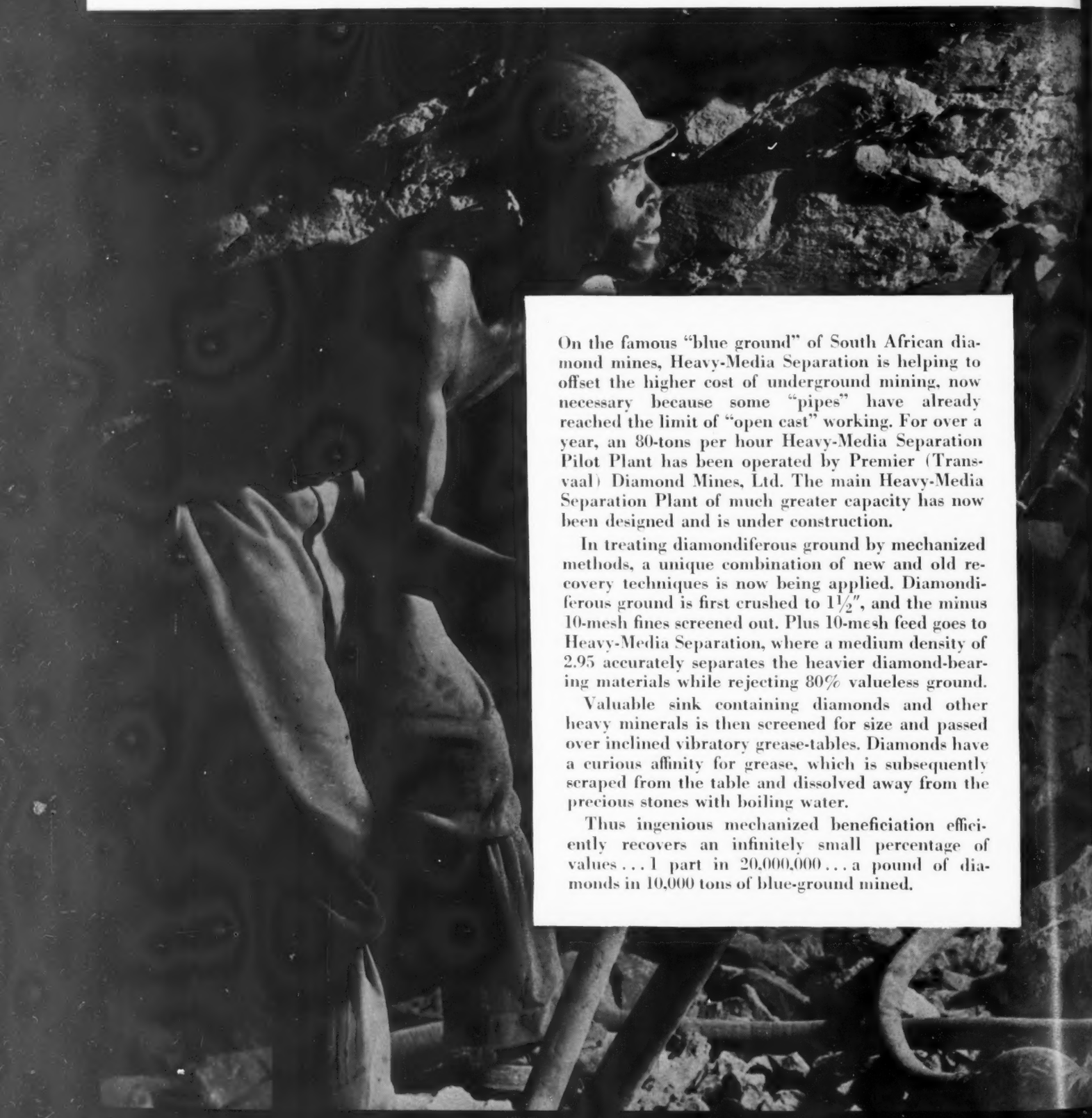
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

HEAVY-MEDIA SEPARATION

so ACCURATE

it is being used to treat DIAMONDIFEROUS GROUND

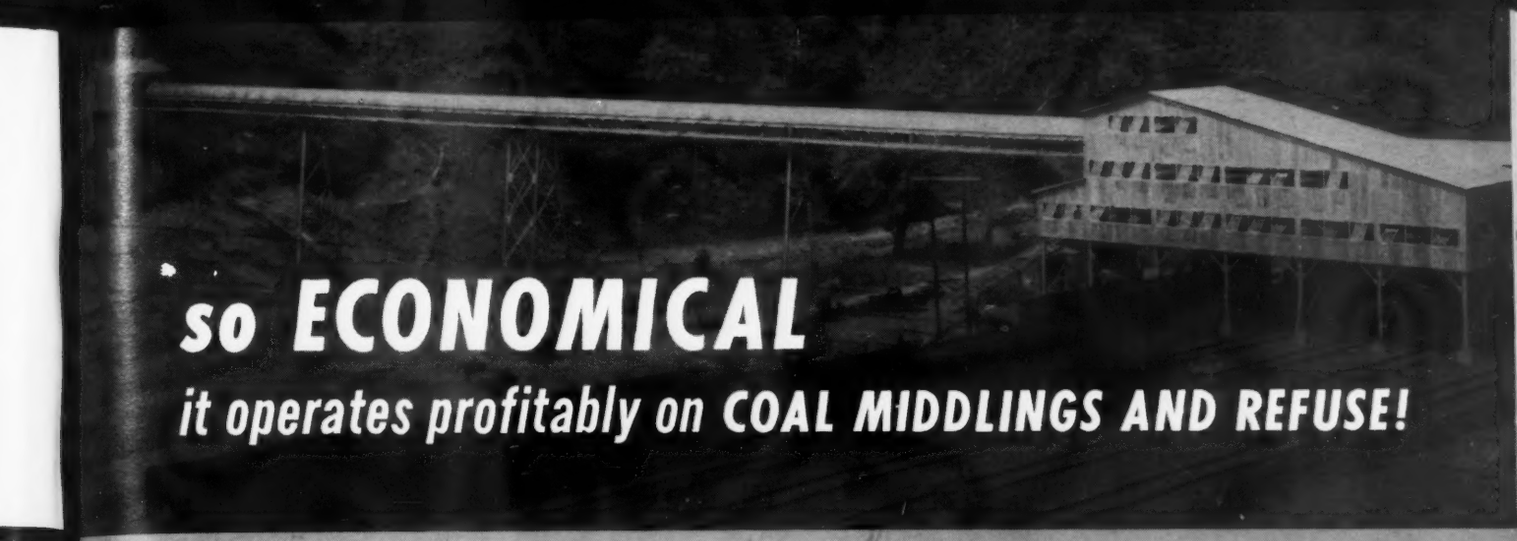


On the famous "blue ground" of South African diamond mines, Heavy-Media Separation is helping to offset the higher cost of underground mining, now necessary because some "pipes" have already reached the limit of "open cast" working. For over a year, an 80-tons per hour Heavy-Media Separation Pilot Plant has been operated by Premier (Transvaal) Diamond Mines, Ltd. The main Heavy-Media Separation Plant of much greater capacity has now been designed and is under construction.

In treating diamondiferous ground by mechanized methods, a unique combination of new and old recovery techniques is now being applied. Diamondiferous ground is first crushed to $1\frac{1}{2}$", and the minus 10-mesh fines screened out. Plus 10-mesh feed goes to Heavy-Media Separation, where a medium density of 2.95 accurately separates the heavier diamond-bearing materials while rejecting 80% valueless ground.

Valuable sink containing diamonds and other heavy minerals is then screened for size and passed over inclined vibratory grease-tables. Diamonds have a curious affinity for grease, which is subsequently scraped from the table and dissolved away from the precious stones with boiling water.

Thus ingenious mechanized beneficiation efficiently recovers an infinitely small percentage of values . . . 1 part in 20,000,000 . . . a pound of diamonds in 10,000 tons of blue-ground mined.



so ECONOMICAL

it operates profitably on COAL MIDDLINGS AND REFUSE!

Test of a preparation process is its performance on low-quality feed!

Not one, but two Heavy-Media Separation installations, cleaning only middlings and refuse, have demonstrated that this low-cost process *can profitably treat feed of lesser value than poor run-of-mine coal!*

At one washer, a Heavy-Media Separation unit is fed the middlings and refuse from a previously-installed cleaning plant. Although the easy-to-separate fraction has already been removed and the Heavy-Media feed contains up to 70% unmarketable refuse, (and seldom equals poor run-of-mine coal), the Heavy-Media Separation unit makes an economic and efficient separation, yielding a large tonnage of a marketable coal and a final high-ash refuse.

On another property, Heavy-Media Separation is being used to treat a product formerly discarded as a final refuse by a less efficient cleaning method. This product averages 90% refuse but the Heavy-Media Separation unit profitably recovers a high percentage of the saleable coal, producing additional revenue from the coal mined.

These examples highlight the remarkable economy and efficiency of Heavy-Media Separation under adverse conditions. Obviously, it can make economical and accurate separations on run-of-mine coal, even though the feed contains large and fluctuating percentages of refuse. This advantage of Heavy-Media Separation is of prime importance today because of the increased use of full-seam mechanized mining and strip mining. What's more, this process functions efficiently over a full-size range at any gravity from 1.25 to 3.40. Gravity can be maintained within ±0.01, and quickly and easily changed as feed-coal varies. Equipment is standard and time-proved. Operating costs are low.

From one extreme to the other . . . from diamonds to refuse . . . proof positive of the efficiency and economy inherent in Heavy-Media Separation.

Today Cyanamid offers a complete range of Separation Processes by Gravity Difference (Heavy-Media Separation and the Dutch State Mines Cyclone Separator) for new cleaning plants or as adjuncts to present washers.

With a process for every size and specification, and no self-interest in equipment manufacture or plant construction, Cyanamid offers unprejudiced counsel on coal cleaning based on tests of your coal by various preparation processes in the Cyanamid Mineral Dressing Laboratory at Stamford, Conn.

We invite discussion and stand ready to run carload tests on your coal; to cooperate with engineers of your choice in the design of the most efficient separation units into your cleaning plant, and to provide the assistance of Cyanamid Field Engineers in tuning up the installation.

AMERICAN Cyanamid COMPANY

TRADE MARK

30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

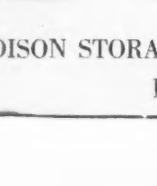
BELOW: cutaway view of typical EDISON cell used in mine haulage batteries.

Why EDISON *Batteries* LAST LONGER

WHAT enables an EDISON Battery to stay on the job, out of the repair shop—to see a mine locomotive or shuttle car through its strenuous duty day after day, year after year with maximum dependability? What makes an EDISON Battery give long life and low haulage cost in spite of the hardest usage?

One of the many answers is its rugged, precise cell construction. Cell containers, covers, pole pieces and other structural parts are made of STEEL. Even the active materials are permanently locked in perforated STEEL tubes and pockets. These in turn are securely assembled into STEEL grids to form the negative and positive plates. Every STEEL cover is welded to its container, proof that no internal trouble is anticipated for the normal life of the cell

Case histories show that EDISON Batteries in mine haulage service have fallen down shafts and gone through many wrecks with little or no damage . . . *and still delivered their full service life.* The fact that they can withstand such accidents indicates the extra dependability that can be expected of them under more normal conditions.



EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES:

They are durable mechanically; can be charged rapidly; withstand temperature extremes; are foolproof electrically; can stand idle indefinitely without injury; are simple and easy to maintain.

EDISON STORAGE BATTERY DIVISION OF THOMAS A. EDISON, INCORPORATED, WEST ORANGE, N. J.
In Canada: International Equipment Company, Ltd., Montreal and Toronto

ALLIS-CHALMERS

"Certified" Service

A BREAKDOWN on this 39-year-old Allis-Chalmers fan motor crippled operations at the plant of an important midwest electric utility. Immediate repair was vital. The Chief Engineer called the nearest Allis-Chalmers Certified Service shop. They picked up the rotor and returned it ready for service in less than twenty-four hours.

This is the kind of emergency cooperation you can expect from every Allis-Chalmers Certified Service shop. On everyday repairs and maintenance too, your Allis-Chalmers Certified Service shop will give you prompt service on Allis-Chalmers motors, pumps and transformers, using factory approved methods and parts. Every Allis-Chalmers Certified Service shop has been selected for skilled, personal, careful workmanship, adequate equipment and *service mindedness.*

HOW TO FIND NEAREST SERVICE SHOP

Allis-Chalmers Certified Service shops are located in major industrial centers throughout the country. New shops are being appointed continuously and most smaller centers will soon be covered. To find the shop nearest you, call your closest Allis-Chalmers District Office.

A 2543

MOTOR DELIVERIES GREATLY IMPROVED

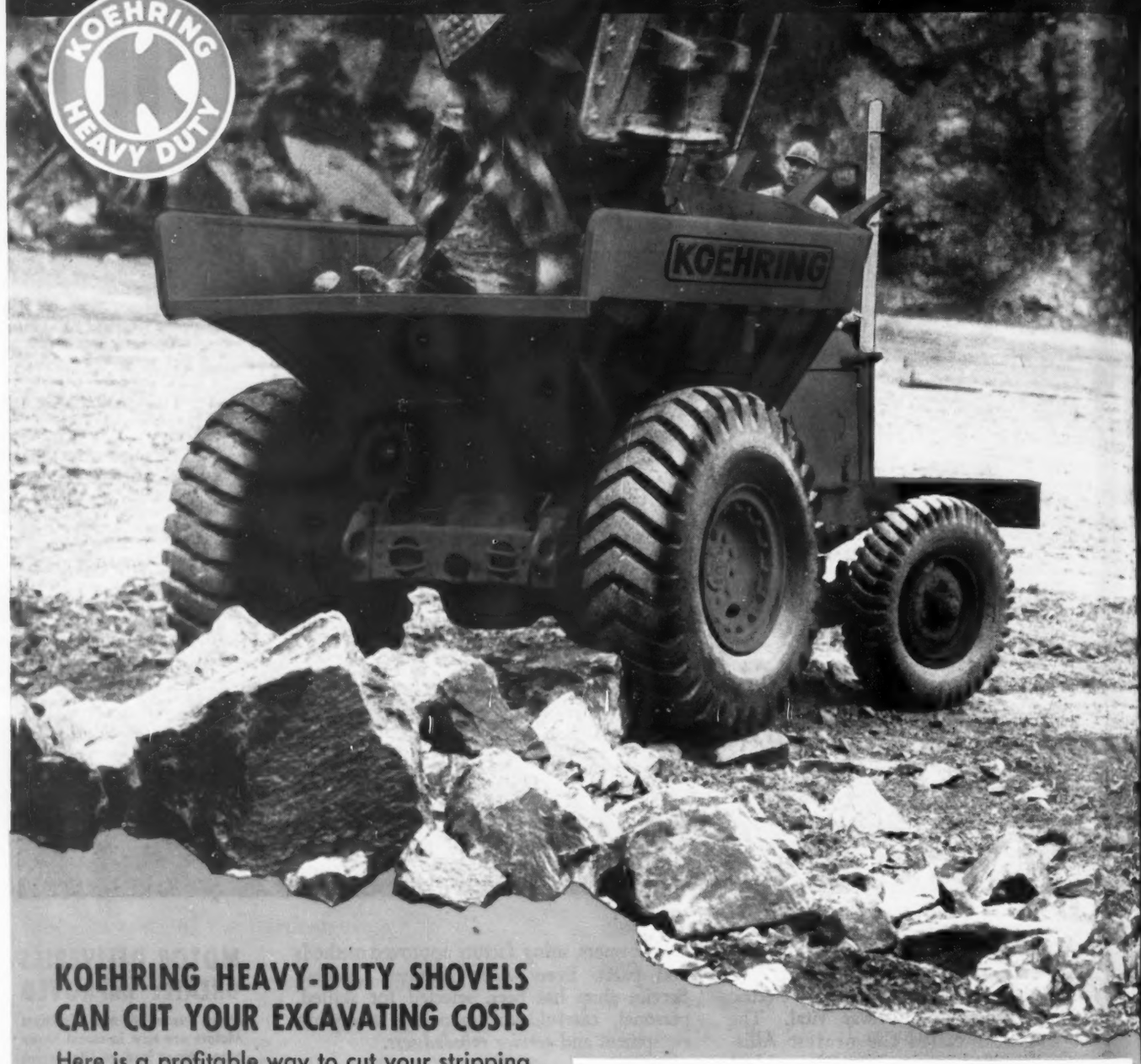
Many types of Allis-Chalmers Motors are now in stock! Many other types are available on short delivery! For motors from 1 to 200 HP, check your nearest Allis-Chalmers Authorized Dealer. For motors larger than 200 HP, check with the nearest District Office. You may be able to get what you need sooner than you think.

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

HEAVY-DUTY



KOEHRING HEAVY-DUTY SHOVELS CAN CUT YOUR EXCAVATING COSTS

Here is a profitable way to cut your stripping and materials handling costs all around. Match high-speed Dumptor-hauling with dependable, heavy-duty Koehring excavators. It's a big production team, built to work together. Dumptor's heavy-duty construction, easy-loading design, fast hauling and dumping, match Koehring excavator's rugged digging ability and fast-operating speeds . . . give you matched speed and strength to keep output high, costs low. For complete facts on the big 1½-yard 605 (illustrated) . . . ¾-yard 304, or ½-yard 205 excavators, see your Koehring distributor . . . or write for bulletin.

for *heavy hauling...*

DUMPTOR BODIES BUILT FOR HEAVY ROCK SERVICE

To meet the toughest hauling conditions of mine, quarry and construction service, Koehring Dumptors have a ton of strength for every ton of payload. Heavy-duty bodies stand up under the severest shocks of loading rock from big mine and quarry shovels. All-welded sides, ends and bottom are heavily ribbed with 4" channels. High-carbon steel gives extra strength at stress points where abrasive rock action is most severe. Three-layer bottom of seasoned 1-⅝" oak between two 5/16" steel plates cushions shocks.

HEAVY-DUTY CHASSIS TAKES ROUGH HAUL ROAD SHOCKS

Rugged, 8" ship-channel main frame . . . 4" chrome steel drive axles . . . and cast alloy-steel "I" beam steering axle, add extra strength to Dumptor chassis. Big tires absorb road shocks. There are no leaf springs . . . only one big-double-coil spring on oscillating steering axle. That means no spring shackles to lubricate . . . no spring maintenance. And . . . you have 6 HP for every ton of gross vehicle weight for faster acceleration, less shifting, more grade-ability. Dumptors climb grades up to 24% with full load.

NO BODY HOIST MAINTENANCE WITH GRAVITY DUMP

You don't lose time or spend money on body-hoist maintenance because Dumptors have no troublesome body hoists. Gravity dumps the full 6-yard load in one second. Free swinging, kick-out pan breaks suction, keeps dumping fast even in stickiest materials . . . adds an extra 3/16" steel to Dumptor bottom. Heavy-duty construction like this is your assurance that Koehring Dumptors will profitably stand up to your heaviest off-the-highway hauling assignments. Let your nearest Koehring distributor show you how.

KOEHRING COMPANY, Milwaukee 10, Wisconsin

Subsidiaries: PARSONS • JOHNSON • KWIK-MIX

Dumptor—Trademark Reg. U.S. Pat. Off. KB09

Keep 'em
TENOL keeps Diesels on

in Service with TENOL

..the Heavy Duty Oil for Heavy Duty Engines

Sinclair TENOL is a heavy duty oil made specially for diesel engine service. It has high oxidation stability—the formation of acidic compounds and resultant gum and varnish is largely eliminated.

Furthermore, TENOL'S detergent and dispersion properties hold possible contamination by carbon and sludge in suspension until drained off in the oil. Selected additive agents protect sensitive alloy bearings against corrosion, and restrict foaming.

Because a clean engine means free rings and pistons and no excessive sludge accumulation, the time between tear-downs is increased—cost per operating hour decreased.

To keep your diesels in steady service, use TENOL for sure, safe engine lubrication.

the Job!

SINCLAIR

HEAVY DUTY LUBRICANTS

YOUR NEAREST SINCLAIR AGENT WILL GLADLY ARRANGE FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

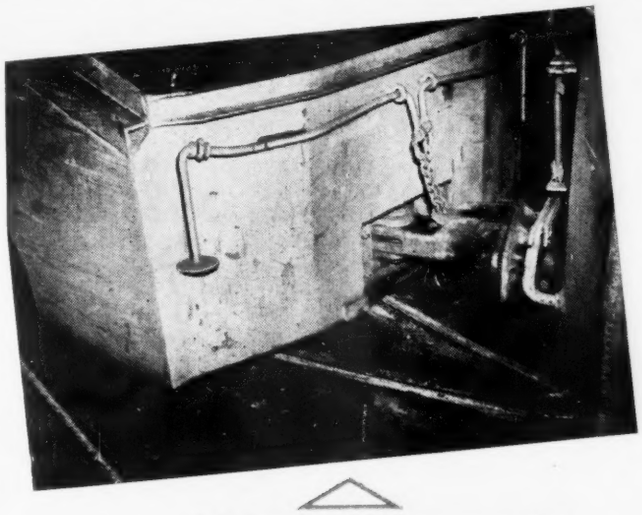
Car changes under the loader and gathering operations are handled quickly. The main line motors usually serve the rooms every four hours, bringing in approximately fifteen empties and taking away the loaded cars.

Cars go through the dump without uncoupling, a rotating head on the coupler permitting a full 360° swivel. This mine is a shaft operation hoisting two 9-ton skips per minute.

All-steel, four-wheel mine cars of 182-cu. ft. capacity are used. Curves have radii as low as 18 feet, the one pictured here has a 20-foot radius.

wouldn't want to go back to links and pins"

The above quotation represents the attitude of the operating staff at the Harwick Mine of the Duquesne Light Company. This modern Pennsylvanian property recently rehabilitated its rolling stock with new all-steel mine cars equipped with O-B Automatic Couplers. When asked why, these three main reasons were given:



O-B Couplers hold the cars together tightly, the male and female coupler heads providing positive interlock.

1. Couplers speed up the haulage cycle. Car changes under the loader are quicker. The cars whizz through the rotary dump in minimum time.
2. Couplers keep the cars fastened together tightly. When two cars come together, you know they are coupled—no one need be around to slip the pin into place.
3. Couplers are easier on mine cars. The elimination of dead slack prevents bumping and banging. The shock that is present is absorbed by the rubber draft gear.

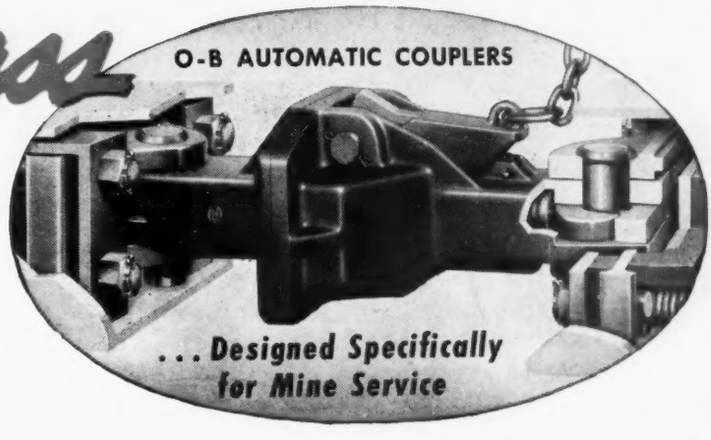
Automatic Couplers can bring the same benefits to your haulage system. If you are contemplating the purchase of new mine cars, make it a point to investigate the O-B Automatic Coupler—the coupler that is designed specifically for mine service. Write today for engineering details.

2802-AM

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd.,
Niagara Falls, Ontario

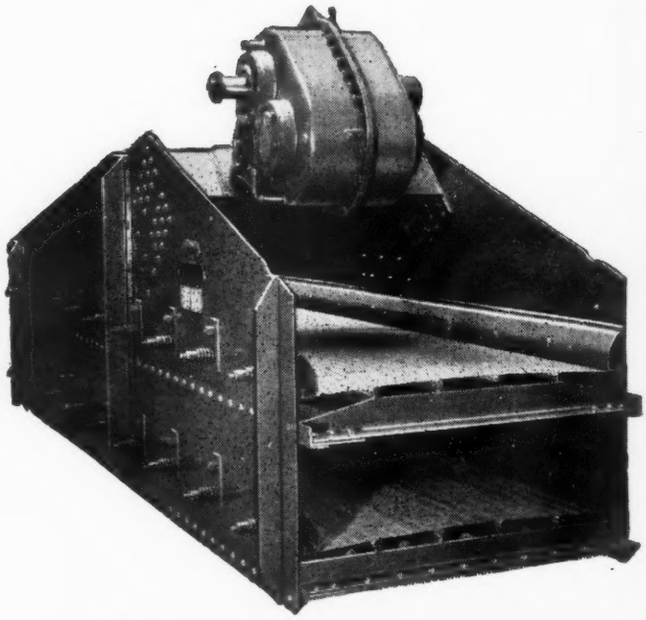


Measure Screen Value These 2 Ways...

CONSTRUCTION

Look at construction first — it has a lot to do with low maintenance and long screen life! Allis-Chalmers builds *Low-Head* vibrating screens of long-lasting high tensile strength steel alloys. All welded parts are "stress-relieved," eliminating local stresses caused by welding. Vibrating mechanism is independently and conveniently located on top of screen — out of the way. Its gears and bearings operate in oil-and-dust-tight steel housing.

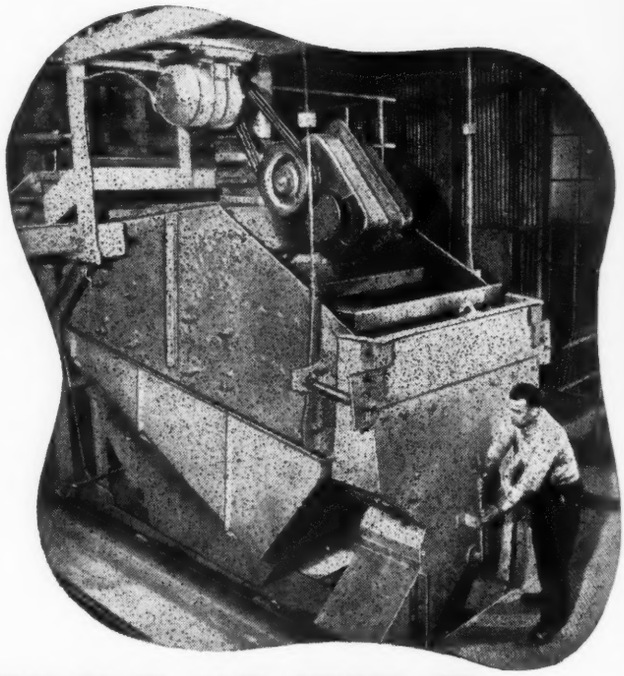
Another important feature of the *Low-Head* screen is the cloth support frame designed to tension screen cloth properly. An increased number of supports and correct crown for different surfaces results in longer screen cloth life!



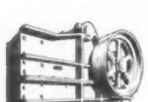
PERFORMANCE

How it works is an equally important measure of screen value. The compact *Low-Head* vibrating screen operates horizontally — saves valuable headroom and space. It can be used for either wet or dry screening... for dewatering ... or as medium drain and wash screens in heavy density separations.

Straight-line motion at 45° to the horizontal results in rapid stratification of feed and a definite conveying action of the material. *Low-Head* screen sizes are from 26 in. x 8 ft to 6 x 16 ft; one, two or three decks. Write for Bulletin 07B6330A. ALLIS-CHALMERS, MILWAUKEE 1, WIS. *Low-Head* is an Allis-Chalmers trademark. A 2517



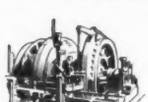
ALLIS-CHALMERS


Jaw Crushers

Gyratory Crushers

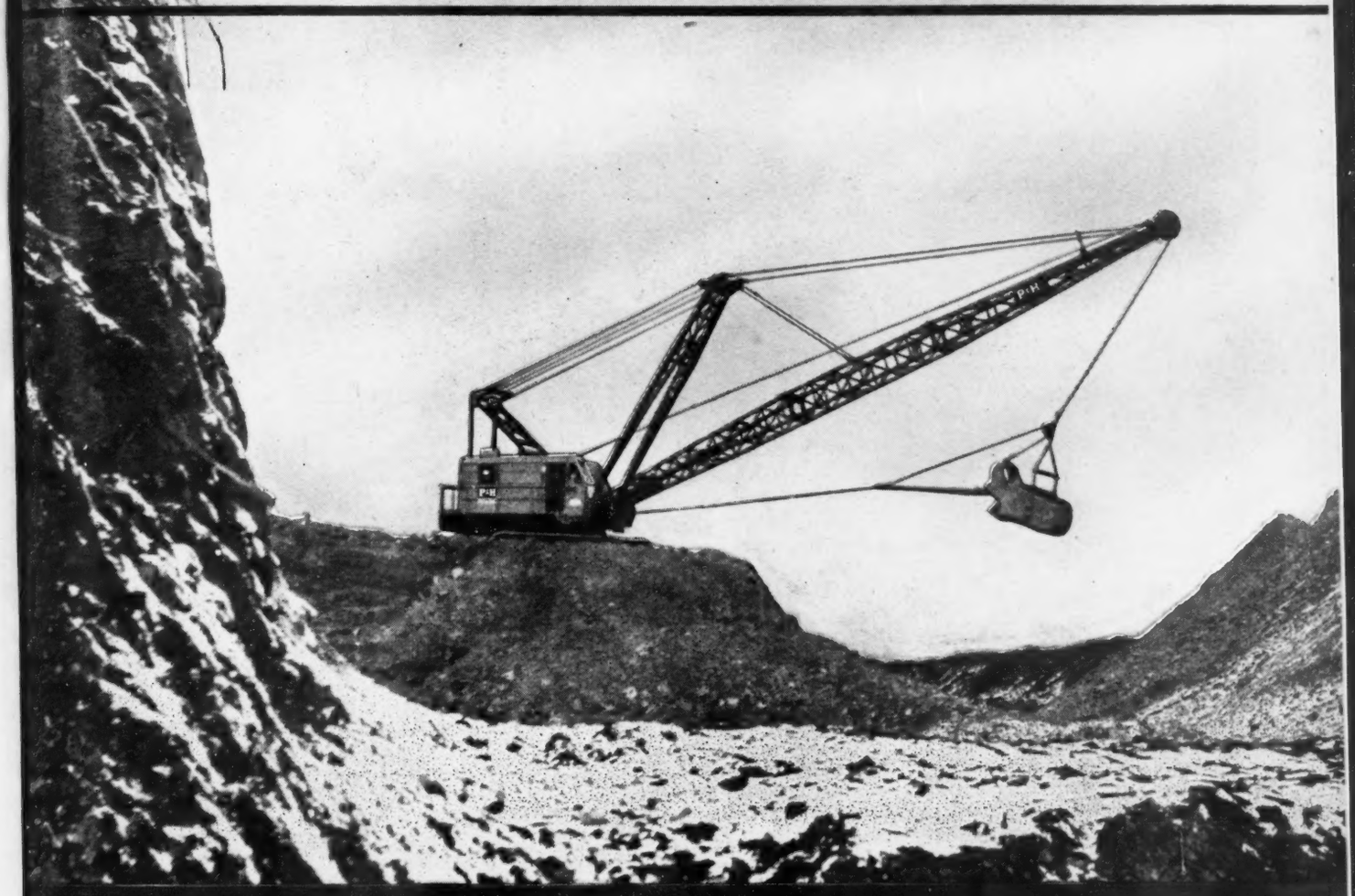
Mills

Kilns, Coolers and Dryers


Hoists

... and Other Equipment for the Crushing, Cement and Mining Industries

LOOK TO **P&H** FOR ADDED VALUES

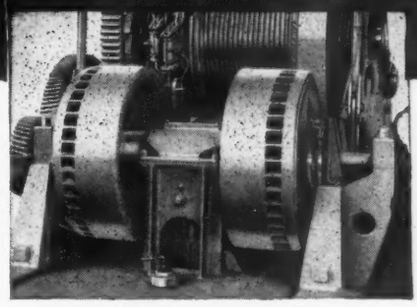


HE SWING'S THE THING!

And here's the kind of swing that's sweet music to production men on steady digging. It's the Magnetorque on P&H 1055 that transmits power for swinging—without mechanical contact—without wear—without time lost for clutch adjustments—without the high cost of lining replacements.

There's nothing to compare with the P&H Magnetorque swing—with its smooth, velvety action—with its simple construction.

If you haven't seen the 1055 in action, write us. We will gladly tell you where the nearest machine is located.



THE P&H MAGNETORQUE transmits power for swing electromagnetically — replaces swing frictions — eliminates the maintenance and repair work that goes with them. The Magnetorque unit will last the life of the machine.

P&H **EXCAVATOR**

4520 W. National Ave.
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

How the proper application

of wire rope

-may save you money

● Every user wants to get the best possible service out of his wire rope but it is amazing how often simple rules are broken in the field. Some operators are careless when installing a new rope . . . they keep machines running when sheaves are badly worn . . . they overload the rope . . . they forget to lubricate the rope.

To help eliminate these human failings, the American Steel & Wire Company maintains a staff of TIGER BRAND Wire Rope Specialists. These men are experienced field service engineers. If you have not checked your equipment recently, for correct wire rope application, call in the TIGER BRAND Specialist. He'll do the job for you without charge. Here are some of the points he checks before recommending the proper wire rope for your job—

1. Method of installing and caring for rope.
2. Diameter of sheaves and drums, and condition of grooves.
3. Arrangement of sheaves.
4. Fleet angles.
5. Loads handled.
6. Rope speeds, acceleration and deceleration.
7. Presence of vibration, whipping.
8. Lubrication.
9. Corrosion.
10. Amount of scrubbing and abrasion.
11. Fitting attachments.
12. Abuses to be corrected.
13. Analysis of service records.
14. Finally: Recommendation of the correct rope to meet all conditions.

To show you how you can save money on wire rope, we have prepared a booklet on proper wire rope application that every user of wire rope should read. You can get a copy by mailing the coupon.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEND FOR NEW FREE BOOKLET

American Steel & Wire Company
Rockefeller Building, Dept. J-11
Cleveland 13, Ohio

Gentlemen:

Send me your booklet, "Valuable Facts about the use and care of Wire Rope."

Name.....

Position.....

Company.....

Address.....

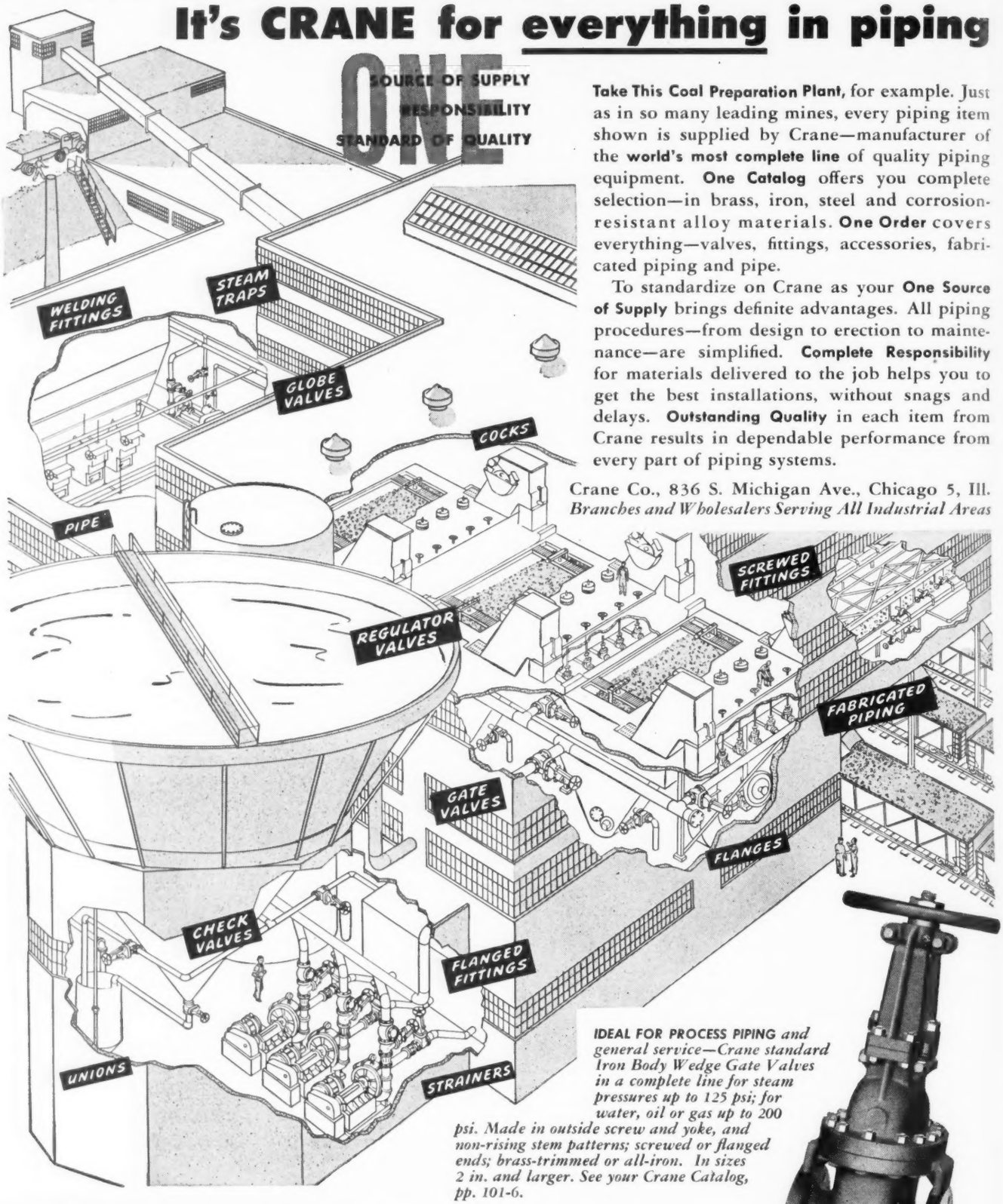
USS

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

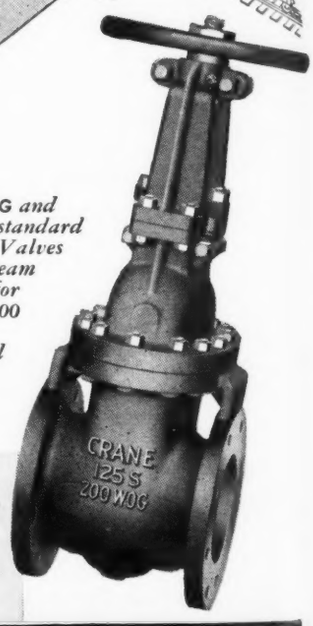
Above ground...or below
It's CRANE for everything in piping



Take This Coal Preparation Plant, for example. Just as in so many leading mines, every piping item shown is supplied by Crane—manufacturer of the **world's most complete line** of quality piping equipment. **One Catalog** offers you complete selection—in brass, iron, steel and corrosion-resistant alloy materials. **One Order** covers everything—valves, fittings, accessories, fabricated piping and pipe.

To standardize on Crane as your **One Source of Supply** brings definite advantages. All piping procedures—from design to erection to maintenance—are simplified. **Complete Responsibility** for materials delivered to the job helps you to get the best installations, without snags and delays. **Outstanding Quality** in each item from Crane results in dependable performance from every part of piping systems.

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



IDEAL FOR PROCESS PIPING *and general service—Crane standard Iron Body Wedge Gate Valves in a complete line for steam pressures up to 125 psi; for water, oil or gas up to 200 psi. Made in outside screw and yoke, and non-rising stem patterns; screwed or flanged ends; brass-trimmed or all-iron. In sizes 2 in. and larger. See your Crane Catalog, pp. 101-6.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

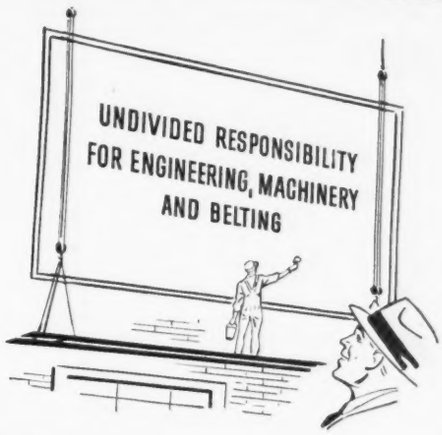
CRANE

FOR EVERY PIPING SYSTEM

How to choose a mine conveyor

1 Select it like you do a piano

You don't buy a piano case from one place and the works of the piano from another. Instead, you buy a complete unit. Apply that same principle to your purchase of a mine conveyor. Get a *complete* unit! Buy both conveyor machinery and conveyor belting from the same source.



2 Count on <u>one</u> source for everything

Your mine conveyor's machinery and belting must be engineered to work *together* —just like the various parts in your piano. Rely on one manufacturer *for both conveyor elements.* Then you'll be sure of undivided responsibility for the whole job. And your mine conveyor will last longer!

3 Specify <u>Hewitt-Robins</u> Mine Conveyors

The Hewitt-Robins Mine Conveyor is the *only* one you can buy as a complete "package." You get machinery and belting engineered as a unit . . . and installed by Hewitt-Robins' service engineers. In fact, Hewitt-Robins is the *only* company that offers you this undivided responsibility.

4 Remember this fact—

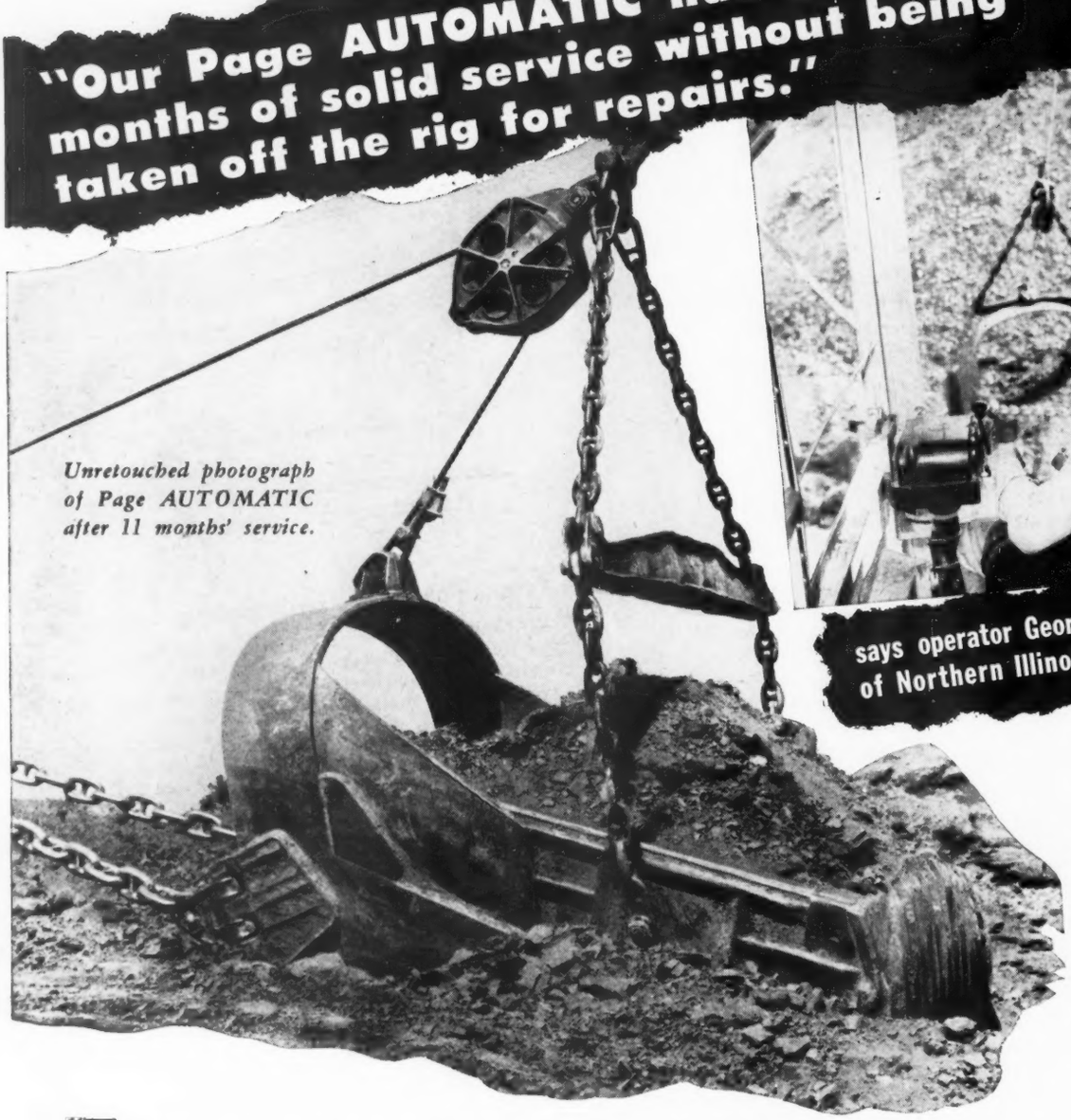
A Hewitt-Robins Mine Conveyor <u>lasts</u> <u>longer</u>. . . for it is the <u>only</u> one engineered, manufactured, and installed as a complete unit.

What's more, it's carried in stock for immediate delivery at Passaic, N. J. or Charleston, W. Va. Call on us for information about Hewitt-Robins Mine Conveyors. Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N. Y.—or Robins Conveyors Division, Passaic, N.J.

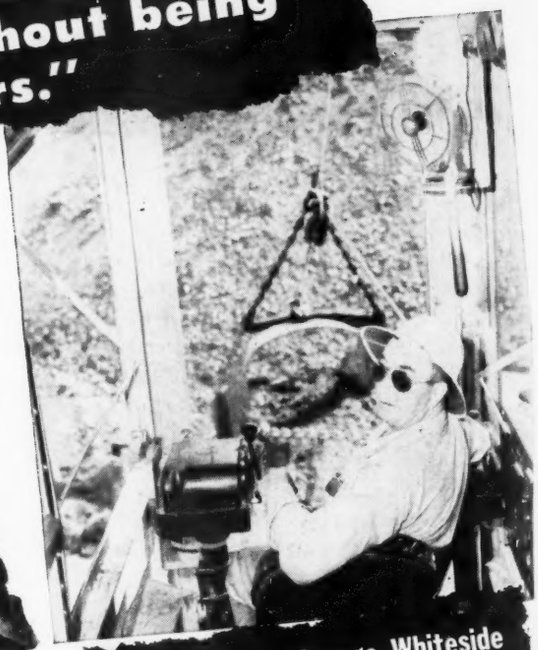
Hewitt-Robins Mine Conveyors

made by HEWITT-ROBINS Incorporated HR

"Our Page AUTOMATIC has given 11 months of solid service without being taken off the rig for repairs."



Unretouched photograph of Page AUTOMATIC after 11 months' service.



says operator George Whiteside of Northern Illinois Coal Corp.

"THAT'S real performance in anybody's language and a record that helps us get top yardage consistently day after day.

"I've operated Page buckets for twenty years . . . everything from small ones right up to this 30-cubic yard AUTOMATIC and they just can't be beat. I always get full loads within 2 to 3 bucket lengths without any recasting or jockeying for position. There is no spillage or windrows and the AUTOMATIC is easy on the cable which means no fairlead chatter.

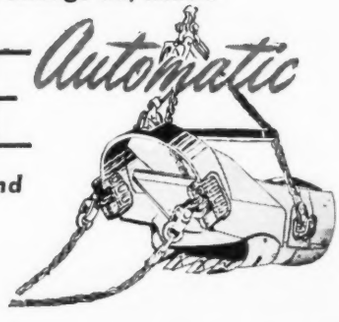
"All in all, the AUTOMATIC does a fine job . . . a full load every minute and at the end of the day, I'm not tired out from wrestling the bucket to keep my quota up to par."

Whether you use a 3/8-yd. or a 30-yd. AUTOMATIC, or any size in between, you can dig more yards at a lower cost per yard than with any other bucket you ever used.

PAGE ENGINEERING COMPANY
Clearing Post Office, Chicago 38, Illinois

PAGE *Automatic*

DRAGLINE BUCKETS *and* **WALKING DRAGLINES**



Cable that

Can't Be Bothered!

EXCLUSIVE ANACONDA BREAKER-STRIP construction and *adhesion* between jacket and insulation that makes a solid block around conductors, combine to make Securityflex* Parallel Mine Cable first in safety because it is *crush-resisting*.

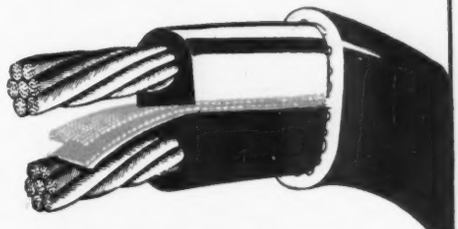
Breaker strip guards against shorts!

That isn't all. Neoprene jacket protects against flame and is highly resistant to both tearing and abrasion. Securityflex mine cable won't kink or twist . . . stands up longer under severe abuse and extreme overloads. Cable meets Bureau of Mines Flame Test and diameter specifications.

Put a length on trial. From then on, you'll always specify Securityflex. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

45108

*Trade-Mark

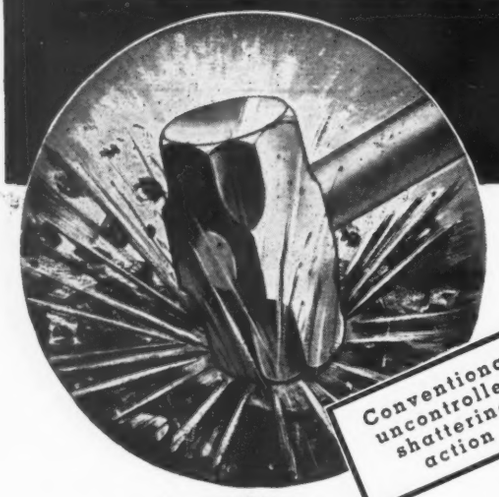


The exclusive Breaker Strip in Anaconda Parallel Mine Cable drastically reduces shorts between conductors. Available with or without ground wire.

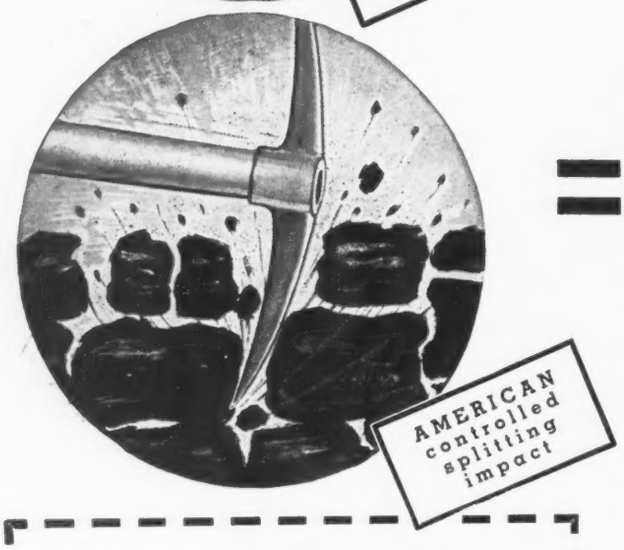
ANACONDA *Securityflex* **MINE CABLE**

ANACONDA
from mine to consumer

PREPARATION vs. PROFITS
answered . . . the AMERICAN way



= UNCONTROLLED SIZING
= EXCESS FINES
= COARSE SIZING



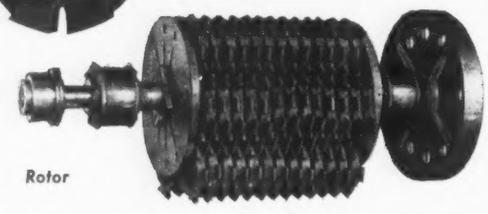
= MORE MARKETABLE
= and PROFITABLE
= CONTROLLED SIZING

Your profit is in the preparation — and American Crushers are designed especially to help you get higher tonnage — greater profits, with lower preparation costs. By reducing coal through cleavage instead of blunt shattering force, Americans give a controlled ratio of fines — no oversize — and permit a high tonnage output of uniform marketable sizes — regardless of the range of reduction.

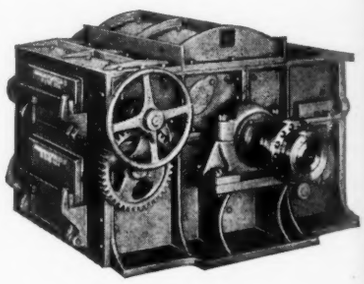
Doubly adjustable for flexibility of sizing to meet fluctuating market conditions, Americans give added savings by operating at low, power-saving speeds. Available in a wide choice of types and sizes to exactly fit your operation . . . capacities from 50 to 500 TPH.

Shredder Ring

Shown here are American's exclusive manganese steel shredder ring and rotor assembly—for rapid reduction action at slow, power-saving speeds. Each ring has twenty cutting edges—and revolves on individual shaft, free to deflect from tramp iron without damage.



Rotor



American AC Type Rolling Ring Crusher, with housing of massive, high-test cast construction, rib-reinforced to withstand enormous crushing strains. Dust-tight, machined joints. All crushing parts of manganese steel.

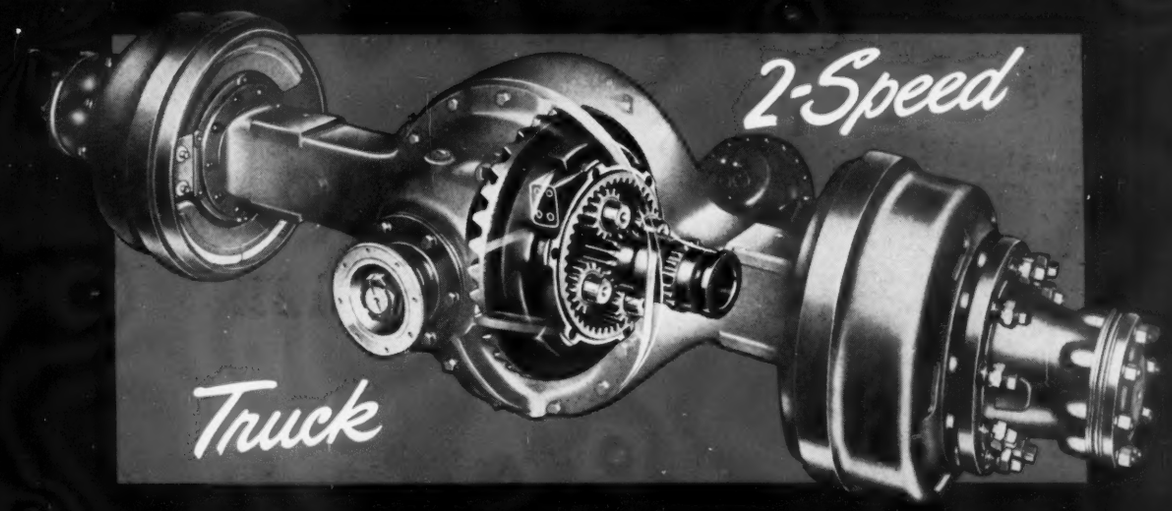
Send for AC Bulletin on coal crushing data and crusher specifications.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

EATON



AXLES

Stand Up Longer Because Axle Housing Deflections Can't Affect the Planetary Gears

The planetary gears of the Eaton Axle are self-aligning under load. This means that they are not affected by distortion of the axle housing. Improper tooth contacts are, therefore, minimized. This exclusive Eaton advantage results in lower upkeep expense and longer axle life. See your truck dealer for complete information.

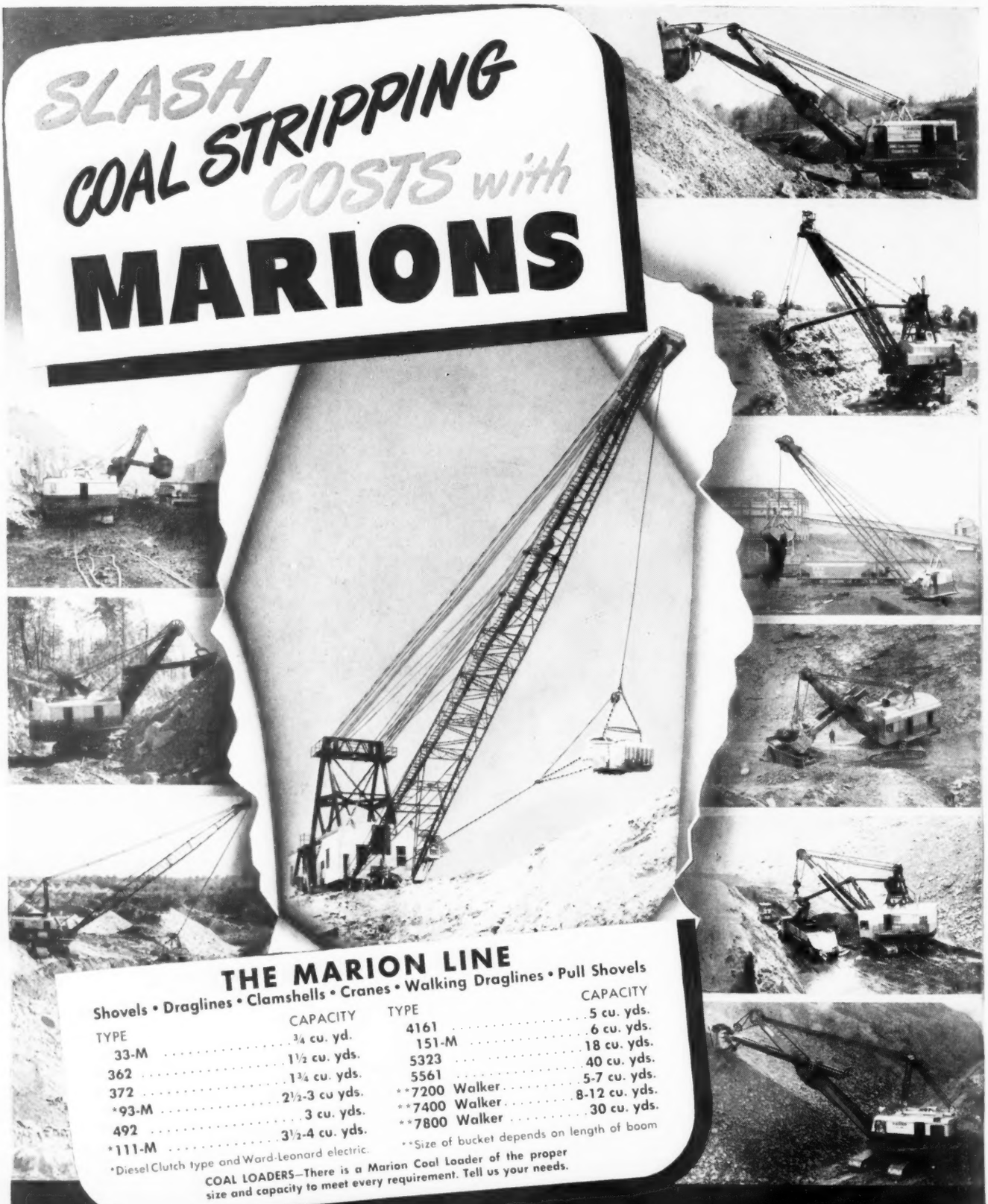
MORE THAN A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

Axle Division

CLEVELAND, OHIO

SLASH COAL STRIPPING COSTS with MARIONS



THE MARION LINE

Shovels • Draglines • Clamshells • Cranes • Walking Draglines • Pull Shovels

TYPE	CAPACITY
33-M	¾ cu. yd.
362	1½ cu. yds.
372	1¾ cu. yds.
*93-M	2½-3 cu yds.
492	3 cu. yds.
*111-M	3½-4 cu. yds.

*Diesel Clutch type and Ward-Leonard electric.

TYPE	CAPACITY
4161	5 cu. yds.
151-M	6 cu. yds.
5323	18 cu. yds.
5561	40 cu. yds.
**7200 Walker	5-7 cu. yds.
**7400 Walker	8-12 cu. yds.
**7800 Walker	30 cu. yds.

**Size of bucket depends on length of boom

COAL LOADERS—There is a Marion Coal Loader of the proper size and capacity to meet every requirement. Tell us your needs.

From 3/4 Cu. Yd. POWER SHOVEL COMPANY MARION SINCE 1884 To 40 Cu. Yds.

MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

Offices and Warehouses in all Principal Cities

Frame Style Nos. 1, 2 and 3 in
3", 4", 5", 6", and 8" sizes
FAIRBANKS
MORSE
Frame Style No. 0 in 2" size
Cross-section of Frames
Nos. 1, 2 and 3. Frame
No. 0 differs slightly

New Arrival in the

FAIRBANKS-MORSE FAMILY!

Here's the new addition to the Fairbanks-Morse Pump family . . . the Figure 5520A line of side suction centrifugal pumps. These open impeller, ball bearing pumps offer a new high in performance.

Designed for economical operation at heads up to 80 feet and capacities up to 2500 g.p.m., these new Fairbanks-Morse Pumps range in size from 2" through 8". They are available for either direct drive from motors or engines or from belt drives. Their unusual compactness assures important space-saving advantages with no sacrifice of efficiency or capacity.

WHEN IT COMES TO PUMPS...

Note these important design advantages:

- Open type, single suction impeller, designed for high efficiency at moderate heads.
- Volute of close-grained cast iron with water passages so smooth that friction and back eddies are minimized.
- Deep stuffing box permits proper packing without undue tightening of the gland . . . simple, easy repacking.
- The same proved ball bearing frame construction for smooth operation and long life used in the other side suction pumps of the Fairbanks-Morse family. Bearing nearest impeller takes radial load only and is free to move endwise. Drive-end bearing takes both radial and thrust loads. Both are sealed to keep lubricant in . . . dirt and moisture out.
- One-piece, solid cast frame for long service . . . suitable for heavy duty belted or direct connected drives. Foot of frame forms a substantial base.

For all the facts on this new line of pumps, see your Fairbanks-Morse distributor or branch house pump engineer. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

Diesel Locomotives • Diesel Engines • Stokers • Scales • Motors • Generators • Pumps • Railroad Motor Cars and Standpipes • Farm Equipment • Magnetos

THE Preformed Challenge
Here's a CHALLENGE to the few who have not used Preformed Wire Rope:
•
Put Preformed to work on your job.
See for yourself if it isn't
• easier to install
• safer to use
• longer lasting
. . . and see if it doesn't
• COST LESS TO USE
That's the Preformed challenge

If you have a Tramp Iron Problem Send for this

NEW CATALOG

FREE

Contains Full Information On:

- **PLATE MAGNETS** — *for*— LIGHT DUTY, MEDIUM DUTY, HEAVY DUTY
- **MAGNETIC PULLEYS** — *for*— TRAMP IRON REMOVAL, PURIFICATION PURPOSES
- **MAGNETIC DRUMS** — *for*— REMOVAL OF FINES, TRAMP IRON
- **PIPE LINE TRAPS** — *for*— 2" LINES, 3" LINES, 4" LINES
- **PNEUMATIC LINE ASSEMBLIES** — *for*— HORIZONTAL INSTALLATION, VERTICAL INSTALLATION

GET YOUR FREE COPY OF THIS CATALOG BY WRITING TO ERIEZ MFG., ERIE, PA.

Catalog Gives Complete

- ENGINEERING DATA
- SPECIFICATIONS
- OPERATING CAPACITIES
- WEIGHTS
- SIZES
- LABORATORY FACILITIES

ERIEZ MANUFACTURING COMPANY

60 East 12th Street, Erie, Penna.

LETTERS LIKE THIS.. *Mean a lot to us!*

THE GAULEY MOUNTAIN COAL COMPANY

MINERS AND SHIPPERS OF HIGH GRADE
STEAM AND GAS COALS

FAYETTE COUNTY

R. H. MORRIS, VICE-PRESIDENT IN CHARGE OF OPERATIONS

ANSTED, WEST VIRGINIA

July 26, 1948

Mr. Charles C. Whaley,
Vice-President,
Myers-Whaley Company,
P. O. Box 789,
Knoxville 6, Tennessee

Subject: Our Order WR-1710

Dear Mr. Whaley:

I want to congratulate you upon the prompt shipment of the Whaley Automat, which is now in operation at our Williams River Mine.

I must say that this is the first time in several years that we have had a piece of equipment such as this shipped right on schedule, and please accept my congratulations.

Yours very truly,

THE GAULEY MOUNTAIN COAL COMPANY

Vice-President

M/R

This letter is no flowery testimonial . . . makes no wild performance claims . . . it's just a simple, straightforward letter thanking us for meeting a delivery schedule. It merely means that a mine was depending on us for delivery at a certain date and was pleased that we fulfilled our schedule. Letters like this prove that the extra effort, extra planning, the careful attention to detail that makes it possible for us to make deliveries on time doesn't go unnoticed by our hundreds of satisfied customers.

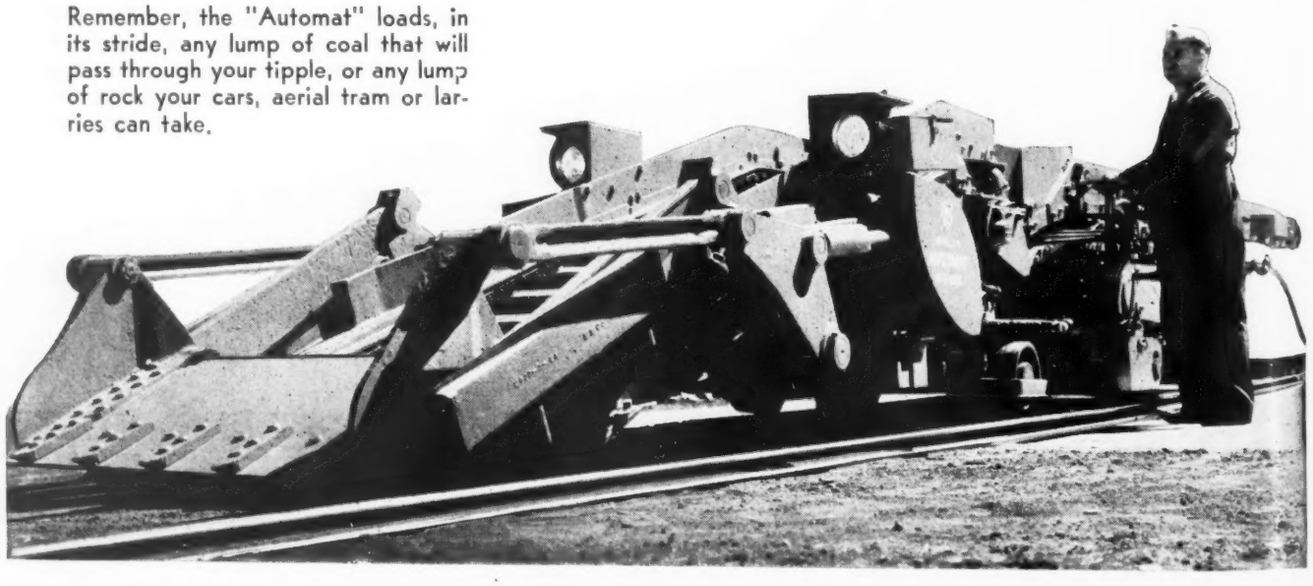
We've been getting letters like this ever since we started making loading machines back in 1908 and we want to keep on getting them. It is our everlasting goal to keep our deliveries good . . . to keep our service good . . . to keep every Whaley "Automat" running with the same efficiency that has made the "Automat" famous wherever loading machines are used.

MYERS-WHALEY

KNOXVILLE TENNESSEE

MECHANICAL LOADERS EXCLUSIVELY SINCE 1908

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larries can take.



WHY USE TWO WHEN ONE WILL DO!

The "*Dual Duty*" Mine Locomotive

. . . . . *low speed for gathering*

. . . . *high speed for secondary haulage*

For the first time, a locomotive has been developed to do both of these jobs efficiently. One locomotive . . . the new Westinghouse "*Dual Duty*" mine locomotive . . . to perform all tractive service from the face to the main haulage siding. It's your sure bet for increasing efficiency and lowering operating costs.

When the locomotive is operating behind the loading machine from reel, low speed is necessary due to the short length of each movement . . . and the temporary tracks. Under this condition, the motors operate at maximum field strength to develop maximum tractive effort at low speed . . . with minimum power consumption.

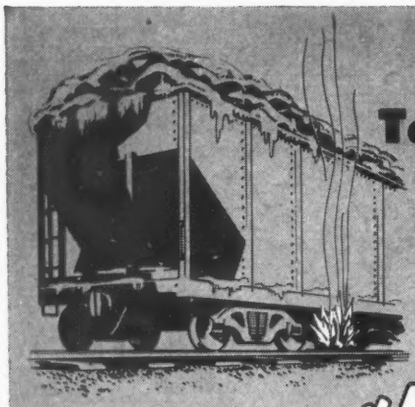
When operating from trolley on more permanent tracks, in secondary haulage service, the motor field's power may be changed to obtain an increase in speed of approximately 40%, thus enabling the locomotive to make the longer movements at an economical speed—all this with no extra operations by the motorman.

Call your nearest Westinghouse office for full details, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-15130

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Mine Locomotives



To reduce unloading troubles . . .

Preparation should include

FREEZE PROOFING

with PERMATREAT Coal Spray

DUST PROOFING

LESS WINDAGE LOSS

PERMANENT ODORLESS TREATMENT

BETTER STOKER FEED

CLEAN HANDLING

Unloading coal frozen in the hopper can be a costly, time-consuming operation. You can avoid this situation by the controlled application of PERMATREAT COAL SPRAY. This oil spray is easy to apply, does an effective job at minimum cost and assures satisfaction from your dealers and industrial consumers.

One of our Coal Spray representatives will be glad to help you solve these problems without obligation.

Ashland PERMATREAT COAL SPRAY seals in dust

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

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FOR LEAKPROOF, TROUBLE-FREE PIPE RUNS

Cut-a-way view of a Walseal Tee showing ring of silver brazed alloy, and completed Silbraz joint.

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On all types of piping jobs where Type "B" copper or red brass pipe is used, trouble can be avoided by installing Silbraz* joints — made with Walseal valves, fittings and flanges.

Threadless, patented Silbraz joints are silver brazed (not soft soldered) pipe joints that are leakproof, trouble-free — permanent . . . connections that will not creep or pull apart; that literally join with the piping system to form a "one-piece pipe line". Thus, these modern joints eliminate the need for maintenance and costly repairs — especially important where lowered operating costs are imperative.

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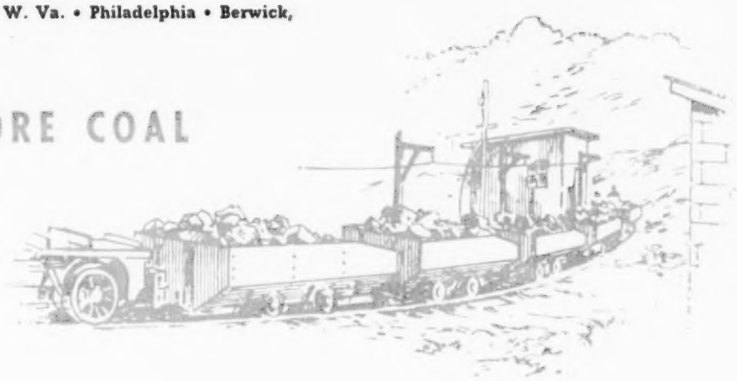
AMERICA NEEDS MORE COAL



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Big-Truck capacity in small space

—plus positive 4-wheel traction for toughest conditions

WALTER 20-TON DUMPER

• The Walter 20-Ton Dumper, with 200 hp. diesel engine, brings you big-truck tonnage in a compact, fast, highly maneuverable back-dump truck, of 12 cu. yd. or 20 cu. yd. capacity, as needed. Having the great traction of the Walter 4-Point Positive Drive, it hauls these loads through soft dirt, deep mud, over slippery surfaces and steep grades—places ordinarily inaccessible for anything except crawlers.

FOR STRIP MINING, the Walter 20-ton Dumper provides high tonnage capacity for short runs and in congested areas, plus the convenience of back-dumping where required.

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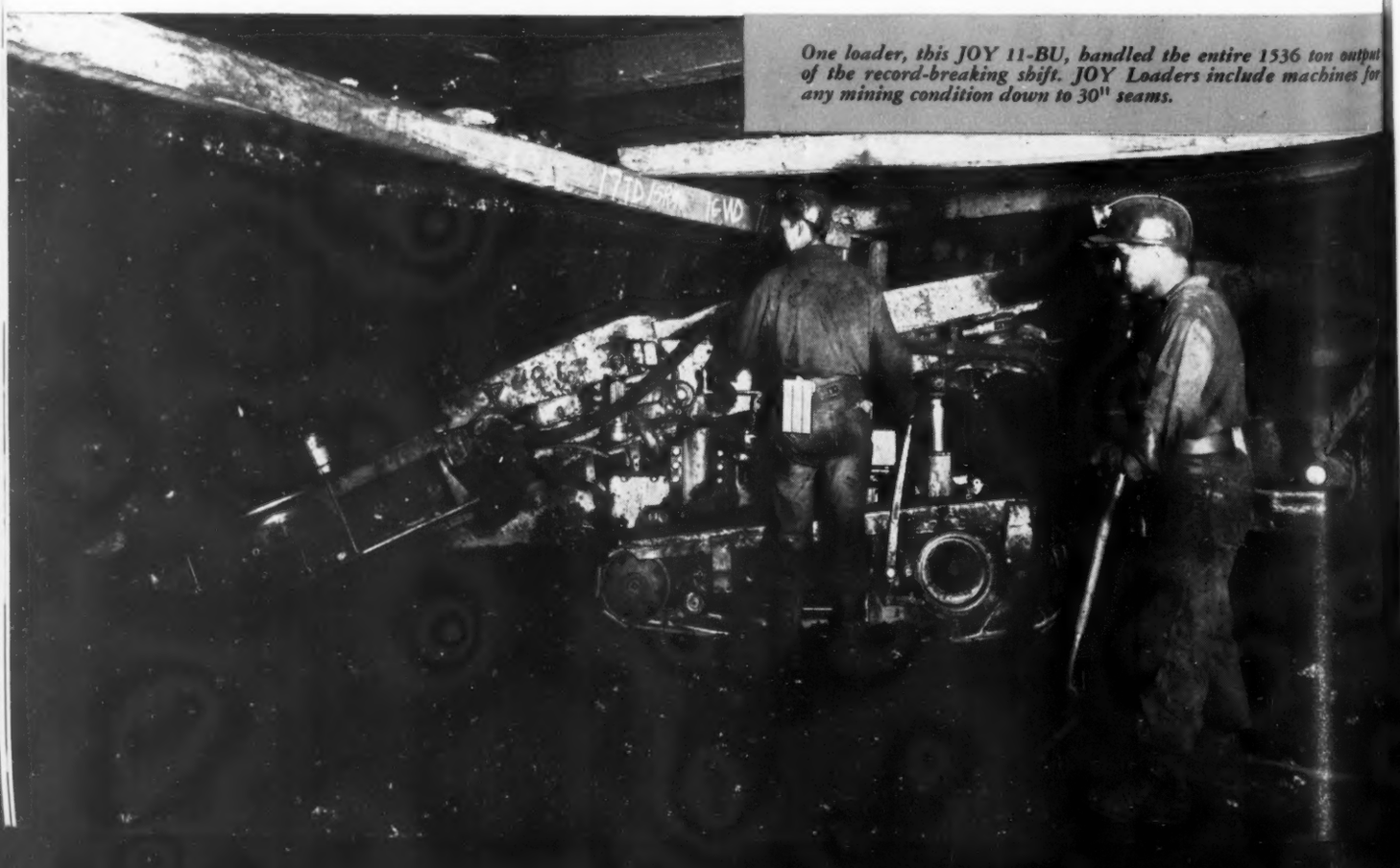
"80.8 tons per Man-Shift!"

Using JOY MACHINES

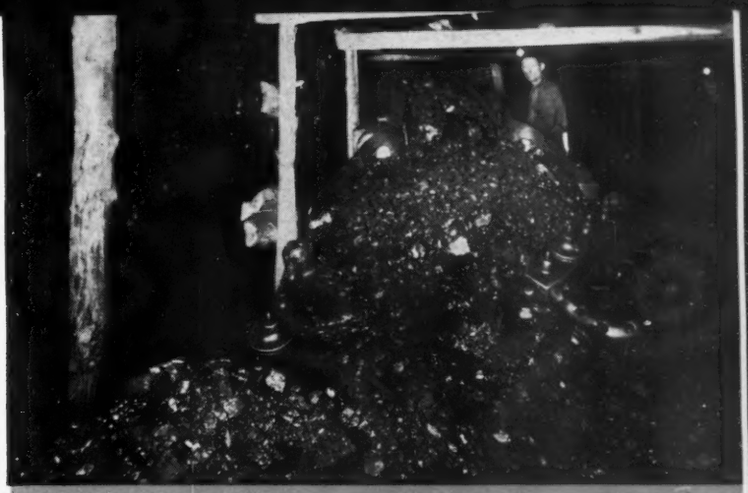
Consol's Mine #63

SETS A WORLD'S TONNAGE



One loader, this JOY 11-BU, handled the entire 1536 ton output of the record-breaking shift. JOY Loaders include machines for any mining condition down to 30" seams.

e JOY 10-RU Universal Cutter on a top cut. JOY Universal tters combine the ability to cut the top, bottom, and shear, or ke selective cuts, with easy handling qualities and high mobility.
Licensed under the patent to E. C. Morgan, No. 1953325



The JOY 11-BU Loader, with a loading capacity up to 10 tons per minute in seams 60" and over. The conveyor end can be swung as much as 45° to either side to suit loading conditions.

RECORD!

Here's the latest *standout* proof of a fact which has been demonstrated many times before, in every coal-mining district . . . that Trackless Mining with JOY Machines *does* result in remarkable production gains and cost savings.

On June 14 this year—using a JOY 10-RU Cutter, a JOY 11-BU Loader and three JOY 5-SC Shuttle Cars—19 men of the Consolidation Coal Co. Mine No. 63, Monongah, W. Va. (including the section foreman) *mined 1536 tons of coal in one 8-hour shift, a new world's record!* They loaded out 35 cuts—each of 9-ft. depth in an 8½ ft. seam—for the tremendous average of 80.8 tons per man.

Whether you're operating in high coal like this, or in seams as low as 30", there are JOY Machines to handle the job. ● Mechanize with JOY Equipment for greatest efficiency and lowest costs. *Write for Bulletins.*

JOY 11-BU loading into one of three JOY 5-SC Shuttle Cars used by the crew. High maneuverability of JOY Trackless Mining Machines saves time and adds to increased production.

The JOY 5-SC Shuttle Car unloading into mine cars. The adjustable elevating discharge of the car eliminates the need for ramps, resulting in savings in both time and money.

Consult a Joy Engineer

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT W&D CL 2156

JOY MANUFACTURING COMPANY

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You're interested in getting good fragmentation . . . to keep digging costs down, yardage up.

Blasters who use Primacord agree that no other detonating agent has *all* these advantages:

1. In normal hook-up, Primacord Detonating Fuse extends the full length of the hole, and — being in contact with every cartridge — it initiates the *entire* charge at *maximum* power.

2. Primacord can be hooked up so that front lines go a split-second before succeeding lines. This relief of burden promotes better fragmentation, and reduces the need for secondary blasting.

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4. Simplicity of the Primacord hook-up method of square knots and half hitches cuts down loading time.

5. Primacord is made in grades to meet every blasting condition, and packed on easy-to-handle spools. P-5

These are the reasons why you should investigate Primacord. For more conclusive evidence, ask a user . . . your explosives supplier . . . or write us direct.

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1948

IVAN A. GIVEN, EDITOR

The Better Road

OPTIMISM tempered by the realization that the bituminous industry still has a man-sized job ahead of it characterized the 1948 convention of the National Coal Association last month in New York City. Once again the proceedings highlighted substantial progress in research, utilization, merchandising, public relations and safety. Once again, also, they were marked by a sober and hard-headed analysis of difficulties—competitive and otherwise. And once again they showed that the industry is determined to press forward even faster toward a final solution to these and other problems.

Competition was recognized as still potent, still able to take business if permitted to do so and therefore still a force to be reckoned with. The answers from the producer's standpoint are the time-tested ones of higher quality, lower prices, better burning equipment and better service. These, it was re-emphasized, are the real keys to maintaining coal's position and enabling it to take advantage of the opportunities bound to flow out of growing population, increasing wealth in the hands of the individual and a steady rise in energy requirements.

This view of the possibilities of the future and the methods of cashing in on them apparently is not destined for acceptance in all quarters, however. A highlight of the United Mine Workers' convention was an announcement by Mr. Lewis that if things get tough in the future the union would impose its own stabilization plan on the industry in the form of share-the-work regulations under the "able-and-willing" clause. Stating in so many words that he expects difficulties and charging that the operators are unable and unwilling to stabilize employment, Mr. Lewis declared that such stabilization is a matter of self-preservation. "So next year, in 1949 or at any other time when evil days come upon this industry, you will find the United Mine Workers moving in, and if there are only three days' work in the industry we will all have three days' work."

A depression could come and coal mining could fall on "evil days," although the preponderance of evidence is to the contrary. But as the answer under such circumstances, Mr. Lewis' proposal leaves much to be desired. Among other things it implies that he expects to penalize efficiency by arbitrarily limiting the time a well-run mine can operate or by forcing it to take on excess and unneeded men. This is added evidence of how far the "able-and-willing" clause can reach, especially if coupled with continued government exemption of unions and union leaders from the responsibilities to the public laid on, for example, the employer.

Bituminous coal, to repeat, has a real job still ahead of it, along with a real opportunity. The growth in the activities now headed up in the National Coal Association and their scope and objectives are evidence that it is accepting its responsibilities to the public as well as to its employees and stockholders. By continuing to support and strengthen these activities, and by backing them up by individual effort, the industry can make "stabilization" both irrelevant and immaterial.

Extra Hazard

WINTER traditionally is the season for an increase in mine explosions. Cold dry air sucks up moisture and makes dust—the big killer in bituminous explosions—easier to ignite. The approach of winter, therefore, should be the signal for even greater emphasis on good ventilation, rock dusting, sprinkling, elimination of ignition hazards and other measures that time and experience have proved will prevent disasters. Action now will save lives and money later.

PLENTIFUL SUPPLIES can help win new customers for anthracite among homes and plants now short of other fuels.

Anthracite Tomorrow

Competitive-Fuel Price and Supply Situations, Plus Improved Burning Equipment, Favor Anthracite's Use in Home and Industry—Capacity, Price and Service Are Big Factors for the Industry to Watch

WITH A MAJOR change in the fuel picture of the United States already clearly in the making, one question that naturally arises is: "Where will anthracite stand in the days to come?" The answer to that question turns on a number of factors, not the least of which are the following:

1. Competitive pressure.
2. Anthracite prices, a function of progress in increasing efficiency and cutting cost.
3. The industry's capacity to produce.
4. Development of equipment for handling and burning anthracite that will provide the maximum in convenience.
5. Sales pressure exerted by anthracite producers and distributors, not to mention manufacturers of anthracite-burning equipment.

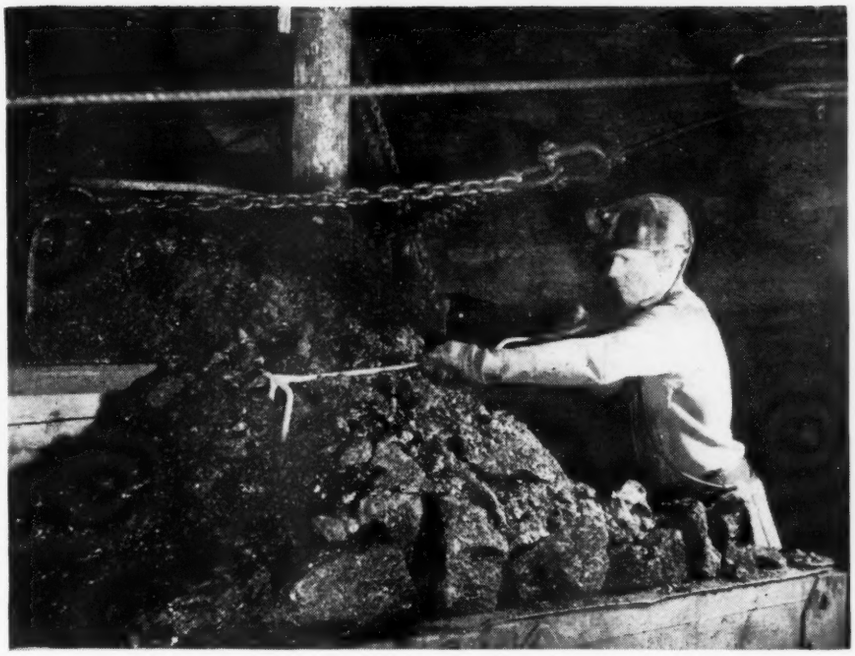
Anthracite's chances in the future, while not necessarily blooming, are, all in all, at least fair. In view of the industry's recent history, that statement might seem a little on the blue-sky side. However, sober analysis of the developing competitive situation reveals a real opportunity if anthracite can attain a reasonable degree of success in cutting cost and putting over its equipment-development and merchandising programs.

From one point of view—consumption per person in the anthracite-burning area as now constituted—anthracite probably reached its peak in 1918. Total production in that year was 98,826,000 tons, of which 4,968,000 tons was exported, against imports of 37,000 tons. Apparent consumption, therefore, was 3.03 tons per person in the anthracite territory.

World War I resulted in anthracite's being zoned out of western territory and not only stimulated competition from bituminous coal but also marked the start of oil and natural-gas competition. In 1920, per capita consumption was 2.24 tons. By 1930, it had dropped to 1.84 tons and, in 1940, to 1.27. A slight rise in consumption per person took place during World War II, with a drop afterward. With an apparent consumption of 48,200,000 tons in 1947, use per capita was approximately 1.16 tons, based on an estimated population of 41,734,000. Reflecting increased production and some reduction in exports from the 1947 total of 8,510,000 tons, consumption per capita should increase slightly in 1948.

Over the same period, bituminous consumption per capita also declined, although only slightly compared to anthracite. In both industries, the decrease took place in the face of sharp price declines. From a high of $5.62 in 1926 and $5.34 in 1923 and 1924, average anthracite value per net ton dropped to $3.64 in 1939. The upward climb since that time brought it up to $7.22 in 1947, largely as a result of substantial wage increases, while worker efficiency dropped from 3.02 tons per man-day in 1939 to 2.78 in 1947. Apparently a further decline in tons per man will be experienced in 1948, according to figures recently issued by the Anthracite Allocation Committee.

Thus, from World War I to the present time, the anthracite record has been one of progressive decline in demand, primarily for the reasons previously enumerated plus major strikes during the '20s. Has



HIGHER MAN-DAY OUTPUT, plus more modernization, are big industry needs.

What Fuels Cost in Anthracite's Market Area*

	Anthracite ($ per Ton)			Fuel Oil (C. per Gal.)		Coke ($ per Ton)	Low-Volatile Bituminous ($ per Ton) R.O.M.		
	Chestnut	No. 1 Buck	No. 2 Buck	No. 2	No. 6	Chestnut	Egg	Domestic	Stoker
Albany	21.35	15.75	14.80	12.5	...	18.60	....	15.25	....
Baltimore	19.80	14.20	13.20	11.3	8.2	....	16.00	12.75	15.25
Boston	21.80	16.00	14.65	12.5	8.8	21.30	17.35	15.75	16.50
Buffalo	20.65	14.35	13.35	13.7	10.5	19.45	14.25	13.30	14.25
Detroit	20.75	16.35	15.35	14.0	10.9	20.60	17.30	16.70	15.65
Milwaukee	22.10	16.30	14.75	15.0	...	20.55	20.25	16.90	17.15
Newark	19.75	13.65	12.60	12.0	8.8	21.95	14.75	12.60	14.65
New Haven	22.45	15.75	13.95	12.1	7.9	20.65	14.85	14.85	13.78
New York City	19.95	13.05	11.95	12.6	8.9	21.16	....	13.15	14.65
Philadelphia	19.50	13.75	12.75	12.0	8.4	20.25	....	11.85	11.70
Portland	22.00	16.25	15.25	12.3	8.3	21.25	16.00	14.70	15.65
Rochester	20.70	14.20	12.85	13.4	...	19.09	....	....	12.75
Syracuse	19.70	13.20	12.20	13.6	...	18.65	12.75	12.95	12.75
Toronto	20.75	14.85	13.75	17.0	...	18.75	15.75	13.30	16.70
Washington	19.30	13.90	12.90	12.5	8.5	....	16.30	14.05	14.55
Wilkes-Barre	14.40	9.20	8.20	12.9	...	....	....	....	....

*Retail prices on Sept. 16, 1948. Except for Toronto, multiply No. 2 fuel oil prices by 188 and No. 6 fuel oil prices by 162 to obtain equivalent price per ton of chestnut or rice, respectively. To obtain chestnut equivalent in Toronto, multiply price of No. 2 fuel oil by 157. Source: Anthracite Institute.

anthracite reached the turning point, or is it slated for further decreases in the future?

Many of the factors responsible for the industry's slide still are present in greater or less degree. However, with the industry's efforts to strengthen its position in both the production and sales fields, it can be said that the industry's chances have improved to a point that can be described as at least fair.

Population growth, of course, is the major factor that should favor anthracite. To recapitulate, the upward trend in population in the present anthracite territory is evident in the following figures:

1910	27,697,000
1920	31,772,000
1930	36,783,000
1940	38,727,000
1947	41,734,000

The population is expected to keep on growing, thus offering anthracite, which is primarily a domestic or space-heating fuel, its major market opportunity in the future.

The marriage rate likewise should encourage the industry. According to figures published by the Anthracite Institute Aug. 25, 1948, 499,000 new families per year were created in the 1945-47 period. Theoretically, new housing should be built at the same rate. Actually, however, the institute points out, approximately 190,000 housing units will be built in the anthracite market area in 1948. Assuming average fuel consumption at 7 tons annually—coal or equivalent—it follows that if the 1948 building rate is maintained, demand for fuel will increase at a rate equivalent to 1,333,000 tons a year minimum.

How much of this total fuel-market growth—or whatever the increase actually turns out to be—anthracite will get will determine its future course, provided also it can hold on to its present business. Price, supply, convenience and the feelings of the consumer, not only about anthracite but also about its competitors, will tell the tale. The fact is that in many of these categories anthracite is in a more favorable position than in many years.

Price Advantage Grows

Take the price factor. Price is becoming one of anthracite's major weapons in the battle of the market place. While average value at the mine has more than doubled in the past 8 or 9 years, the rise in cost to the consumer has been less than for other fuels and necessities. Since 1939, for example, the price of chestnut anthracite to the customer has gone up 94 percent; No. 2 fuel oil, 114.6 percent; and all foods, 131.6 percent. Since June, 1946, when most OPA controls were abandoned, the rise in the price of chestnut anthracite, as of July 15, 1948, was 18.3 percent; all cost-of-living items, 30.3 percent; all food, 48.9 percent; and No. 2 fuel oil, 55.9 percent.

Even more striking evidence is provided by comparing average refinery prices for fuel oil as reported recently to the House Committee

on Interstate and Foreign Commerce. Between 1936 and April, 1948, on the basis of comparisons by the Anthracite Institute, light fuel oil rose from the equivalent of $6.27 to $16.83 per ton, or 168.4 percent, while the realization on pea and larger rose from $5.67 to $9.96, or 75.7 percent. On heavy fuel oil, the rise was 232.4 percent ($2.93 to $9.74 per ton equivalent), while the rise on buckwheat and smaller was 112.9 percent ($2.10 to $4.47 per ton).

Comparative retail fuel prices of Sept. 16, 1948, as compiled by the institute, are shown in the accompanying table. Oil generally is substantially higher, even in the case of the more expensive chestnut. So is coke. Even with low-volatile, the principal bituminous competitor, the prices in the stoker sizes are not greatly different and, in some instances, low-volatile stoker coal is even higher than the equivalent No. 1 buck.

All in all, according to institute figures, an anthracite stoker will heat a given home at a cost of 32 to 52 percent less than with an oil burner, depending upon whether the stoker is using No. 1 buck or rice. And on the basis of retail prices on Sept. 16, 1948, the cost in many localities will not be greatly more and in some areas less than with a stoker fired with low-volatile bituminous.

Gas Rates Going Up

When it comes to manufactured gas—the principal gas competitor so far—anthracite's price advantage is strikingly clearer. An analysis by the Anthracite Institute of present and proposed new gas rates in Rochester, N. Y., released Sept. 15, 1948, shows that under the old rate Rochester gas for heating is equivalent to anthracite at $26.93 a ton; under the proposed new rate, $31.40 a ton. In the case of the Westchester Lighting Co., the institute reported Sept. 1 that heating a home in New Rochelle, N. Y., with gas would entail a cost equivalent to anthracite at $28.74 a ton under the old rate and $45.03 per ton under the new rate authorized earlier this year. Bottled gas, depending on the price, which averages 10c. per pound and occasionally goes as low as 6c., is equivalent to anthracite at $120.90 to $72.54 a ton.

From the price angle, therefore, anthracite is in a more favorable position than in many years, even in competition with bituminous of the type usually employed as an alternative. Since oil is unlikely to get any cheaper and the gas situation cannot be altered materially in the near future without bringing in cheaper natural gas, maintenance of this cost differential or, if possible, a reduction, will enhance anthracite's position. Bituminous, of course, will remain the major competitor with anthracite, as is indicated by an institute digest of a recent survey by an oil-burner manufacturer, who pointed out that only 452,000 of the 10,000,000 dwelling units in the anthracite area are heated by gas and only 1,732,000 oil burners are in service. The relative cost of anthracite and bituminous, therefore, must remain an important factor in the competitive picture.

Mining Costs Critical

The drop in tons per man-day in anthracite so far this year is a danger signal competition-wise. However, increased emphasis on cutting the cost of production is a logical step to guard anthracite's position, particularly with respect to bituminous competition, where further increases in productive efficiency can confidently be expected.

As for supplies, in comparison with the free-running floods of earlier periods, some of anthracite's competitors, excepting bituminous, are now finding it necessary to apologize and explain why a customer must wait for delivery and, on occasions, go without for a time. Oil is making a herculean effort to remedy the tight liquid-fuel situation. However, with rising demands complicating increasing production difficulties, there is little reason to expect that fuel oil will be plentiful any time in the near future. In addition, because of the close match between supply and demand, oil is becoming more vulnerable to strikes, with consequent increased interruption of supplies to users.

Manufactured gas difficulties of the past season or so can, of course, be licked, but at a substantial price for the extra facilities needed to carry peak loads or provide extra storage. At the present time, therefore, the consumer has a choice between taking a chance on a service slowdown or interruption or paying out more money for extra facilities.

If natural gas, not yet a major competitor, moves into the anthracite territory in appreciable quantities, as is proposed, the supply and price situation would be approximately the same. Pipeline companies of necessity must operate lines at near capacity a large part or all of the time. The tendency, therefore, is to build load to the point where a cold snap finds the lines without enough reserves to meet bigger demands. The result is that, as has happened in several areas in the past few years, something has to shut down, unless—again at a price—added line capacity or storage facilities are provided. In addition, the increasing distribution of natural gas is bringing up more and more the question of where the gas is to be obtained or, if an initial flow can be secured, how long it will last.

Anthracite, therefore, finds itself favored—at least for the time being—by real and probably continuing supply difficulties affecting the competitive strength of oil and gas. Coke is being pre-empted by the steel industry and a free supply can come only from a major increase in coking facilities or a decline in steel production, both of which apparently are some time off, to say the least. Only bituminous coal is in a good position from the supply standpoint.

Capacity a Vital Factor

How about anthracite itself? It faces a seasonal problem, of course. However, it might face an over-all problem as a result of failure to replace producing capacity that undoubtedly will disappear in the next three to five years, a considerable part as the result of the working out of independent operations. Stripping and bank recovery, in fact, have obscured the fact that the deep capacity has been substantially reduced as well as the equally important fact that little progress has been made in increasing efficiency in underground anthracite mining. If an increase in demand occurs—and it can be assumed that it will occur—the industry should have its plans ready for bringing in the necessary producing facilities or enlarging the output of present operations, or both. If efficiency can be increased at the same time, a double benefit will result.

Price and supply have not been the complete answers to the marketing problem in the past and it need not be assumed that they will suffice in the future. Oil and gas have made their gains because they offered maximum convenience and because they were clean, made no ash and were easy to handle. This, of course, is not to imply that equal

convenience, cleanliness and ease of handling are not available with anthracite. However, anthracite—and other solid fuels—has long been dogged by consumer thinking that classed it as laborious, messy and dirty, and oil and gas as clean and carefree.

Perhaps spurred by price and supply difficulties, public opinion appears to be swinging toward coal, although it still is a long way from giving coal a clean bill of health. The recent history of oil- and gas-burner sales is a significant development. Both have shown substantial declines. Shipments of oil-fired conversion burners, boilers and furnaces in the first six months of 1948, according to the Gas Appliance Manufacturers' Association, totaled 102,800. In the same period in 1947, the total was 162,000; 1946, 241,200. As for oil burners, installations in the first six months of 1948 were estimated by *Fueloil and Oil Heat* at 167,355 units, or 57 percent less than in the first six months of 1947. Of the total, 47,098 were replacements, 55,611 went into new homes and 64,696 represented conversions from other fuels.

The possibility that a decided swing to solid-fuel equipment may be under way is indicated by Department of Commerce reports on shipments of warm-air furnaces in the first six months of 1948. Of the total of 288,000 shipped, 150,000 were for solid fuels, 65,000 for oil and 73,000 for gas. Even though the total was down, solid-fuel units registered a new gain, since the proportions in the first six months of 1947 were as follows: solid fuel, 140,000; oil, 130,000; gas, 101,000; total, 371,000.

Homeowners More Receptive

Thus, there is good evidence to indicate that the home owner is disposed to take a new look at his heating situation. Anthracite has a good start with the new Anthratube now in production to supplement the stokers already on the market. The vigorous advertising campaign now under way, supplemented by research and service to the home owner, should accelerate the process, especially if individual producers, retailers and equipment manufacturers and distributors intensify their own efforts and thereby beef up the industry program designed to sell automatic, convenient, low-cost heat with anthracite.

Residential heating is and undoubtedly will remain anthracite's mainstay for some time to come. However, there are possibilities in other directions as well. An example is the production of synthetic liquid fuel and gas.

Industrial Prospects Brighten

Using a new process based on German methods, a pilot plant for producing fuel and synthesis gas from silt is under construction at the Anthracite Institute laboratory. Silt, air and steam are the ingredients and the product is a producer gas or a mixed water and producer gas. The first practical use of this new process is seen as the production of gas for colliery-fuel use, releasing more valuable sizes for sale. In addition, the process also can produce gas for synthesis into liquid fuels and companion products. Reserves of some 200,000,000 tons of silt and an annual output of some 5,000,000 tons assure an ample supply of the basic material.

Iron production, melting and refining promise another industrial outlet for anthracite. Research already has demonstrated real advantages in cupola operation, though some problems, such as fuel-bed resistance, remain to be solved. Sintering to produce iron from iron ore is another possibility.

Along these lines, the H. A. Brassert Co., consulting engineers of New York City, recently reported the successful conclusion of nine years of work in a new process for reducing iron ore to iron by the use of anthracite or natural gas. Pure melting stock, according to the Brassert organization, can be produced with anthracite at a cost of $21 to $26 a ton, compared to a current average cost of around $28 to $30 per ton in the conventional blast furnace using coke as the reducing agent. The process also has the collateral advantage of producing large volumes of byproduct solid carbon dioxide—dry ice. In the near future, it was announced, a $1,500,000 plant will be constructed on the Atlantic seaboard for iron-ore reduction by the new process, using considerable quantities of anthracite.

Power generation also is an outlet for anthracite that shows real promise, particularly in the use of silt. Reflecting the increases in demand for energy growing out of increased population and increasing wealth in the hands of the individual, utilities everywhere are straining every facility to raise generating capacity.

Even after the present postwar bulge is over, there will be a steady increase in the demand for electricity. New power plants in the anthracite territory already have increased consumption of hard coal and more can be expected, especially where the plants are close to the mines. Even farther away, there are indications that with changing supplies and fuel-price revisions, the industry can expect an increased chance at supplying fuel for power. These same factors also are tending to focus increased attention on the possibilities of using more anthracite in industrial boiler plants.

Of these and other possible industrial outlets, steam raising and power generation are the most immediately promising and offer the possibility of an increase in demand for the smaller sizes commensurate with or perhaps slightly better than for domestic sizes. They also provide possible outlets for silt.

Over-all Picture Favorable

To repeat, the preponderance of evidence indicates that anthracite has at least a fair chance at more business in the future as a result of increased population and energy use and changes in the fuel-supply and price situations. Anthracite also has a number of problems to be licked if it is to capitalize on these opportunities to the fullest. Among them are the following, to mention only three:

1. Price of product, in turn depending upon increased operating efficiency, particularly in deep mines. A major factor is creating a cooperative spirit among miners, which must be backed up by efficient management and the fullest use of modern equipment and methods.

2. Adequate and unfailing supply, involving an employer-employee understanding that minimizes or eliminates work stoppages and careful attention to maintaining the necessary mine capacity.

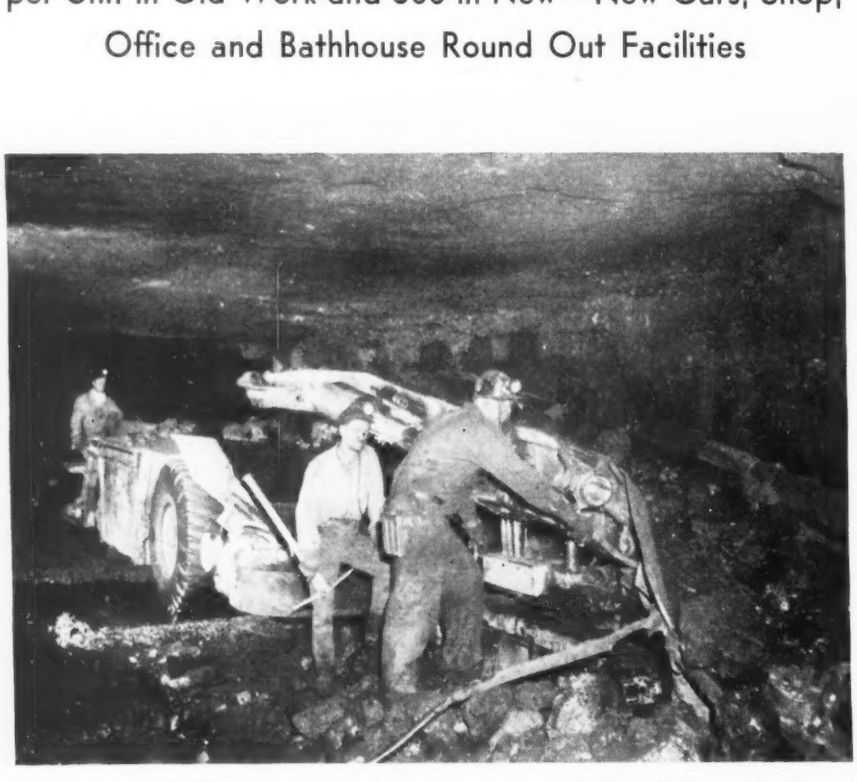
3. Continued emphasis on the development and distribution of modern anthracite-burning equipment, supplemented by the necessary service. This involves also retail coal dealers and equipment manufacturers and distributors, as well as individual producers.

None of these problems are insuperable, while the rewards in a little extra effort are substantial.

LOW-TYPE MACHINE, purchased for use where the coal thins, discharges into a shuttle car.

Trackless Mining at Wattis

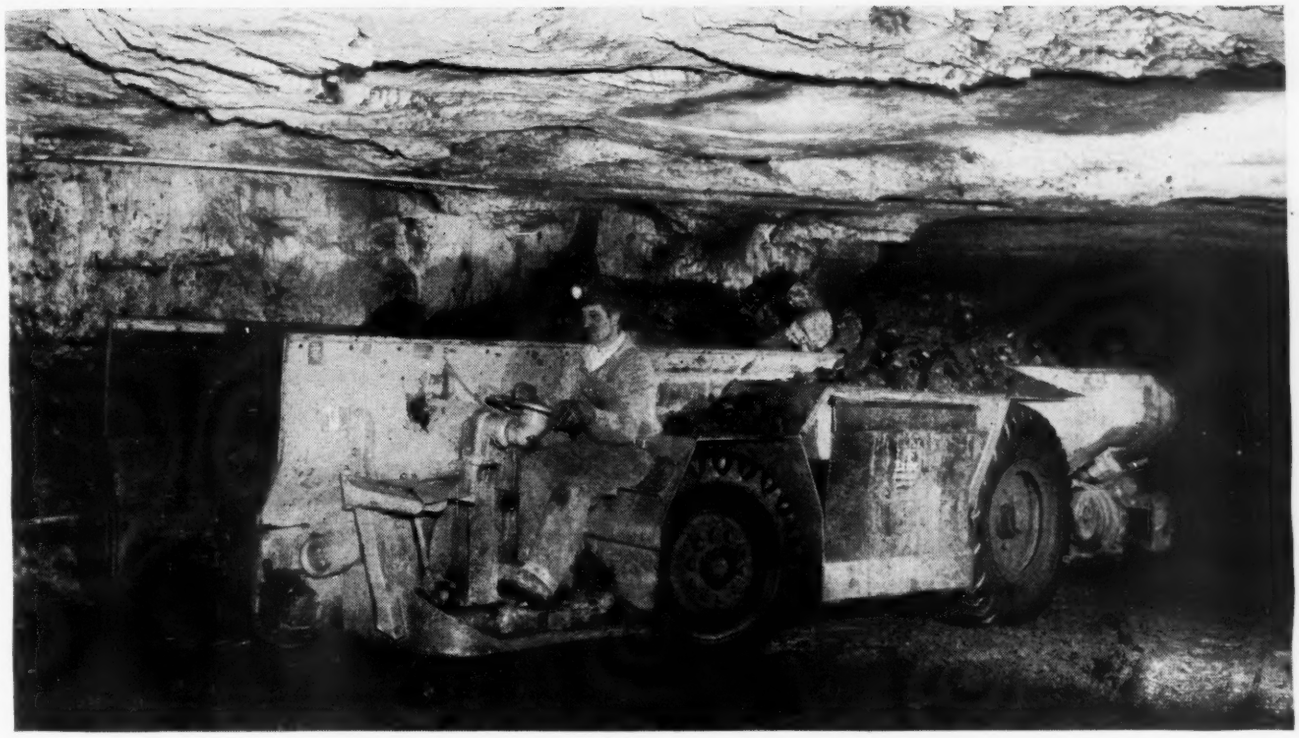
Trackless Units Prove Versatile Both in Mining Old Pillars and in New Work at Wattis—Average Output 400 Tons per Unit in Old Work and 500 in New—New Cars, Shop, Office and Bathhouse Round Out Facilities



HIGH-TYPE MACHINE, one of three ultimately to be used, loads to high-type shuttle car.

HIGHLY successful pillar extraction accompanies high tons per man in trackless mining with shuttle cars, rubber-tired cutters and rubber-tired drills at the Wattis mines of the Lion Coal Corp., Wattis, Utah. In mining old pillars, some of which have been standing 20 years or longer, crews of 13 to 15 men are averaging 400 tons per shift. The average in new work with 15-man crews is 500 tons. Including some 40 outside employees and a number inside cleaning up and preparing old pillar sections, an average of 175 to 180 men were producing 2,400 tons per day from coal 7 to 8 ft. thick under 1,000 ft. of cover at the time this article was prepared.

Two mines presently comprise the Wattis operation, which was opened in 1917. Hand loading was the practice until the depression days, when four track loaders were installed. With good trackmen becoming progressively harder to get, thus making track-loader operation more and more difficult, it was decided to go to trackless mining. The first unit went into service in 1946. Two more have since been installed and a fourth is expected before the end of 1948. Two-shift operation is the nominal schedule, but the actual number of shifts worked per

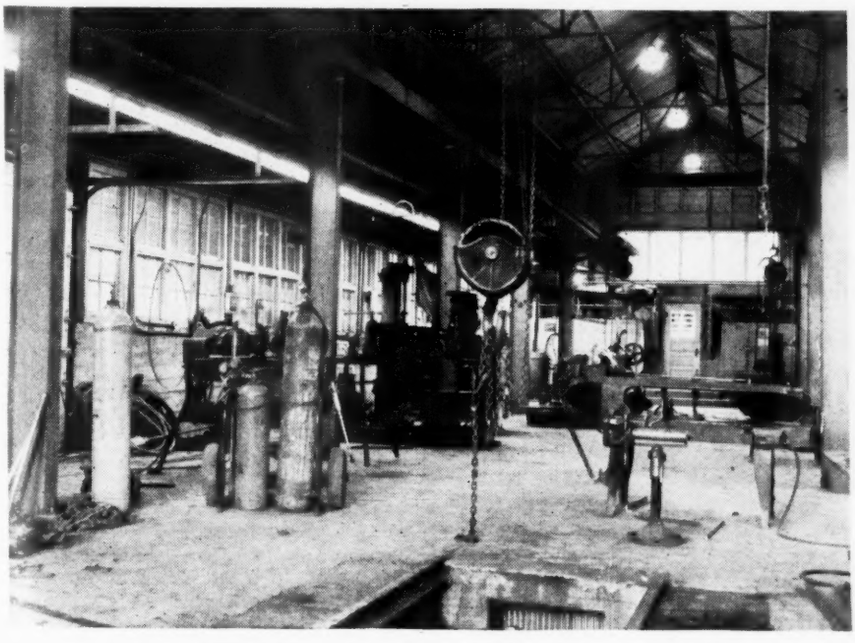


WATTIS SHUTTLE CARS employ battery power for greater flexibility.

week or month is dependent upon market demand and, to a lesser extent, other operating factors.

Wattis No. 1 mine recovers the Wattis seam, 8 ft. thick with a good sandstone top. No. 2 mine recovers the top split of the Hiawatha seam some 90 ft. below the Wattis. Thickness of the top split at Wattis is 7 to 8 ft. and the top also is good sandstone. The bottom split, some 40 ft. below the top, is present on the property but is not being worked. Average cover over the workings, as previously noted, is approximately 1,000 ft. at the present time. The maximum over the property is 2,000 to 2,500 ft.

Coal from the No. 1 mine is more fragile and does not stand storage as well. Consequently, it usually is crushed to nut and pea before shipment. Coal from No. 2, however, lends itself to production in a variety of sizes, including special stoker. Normal output is 1x0 slack, with or without oil treatment; 1⅝x0 slack, with or without oil treatment; 1x3/16 special oil-treated stoker; 3x1⅝ nut; 8x3 stove; and 8-in. lump. To make these and other sizes, preparation facilities include crushing equipment, Universal vibrating screens and Viking oil-treating equipment. The larger sizes, naturally, are carefully hand picked, although the coal itself is largely free of banded impurities or partings.



NEW WATTIS SHOP features radiant heating from the concrete floor.

Other outside facilities include a complete new mine shop featuring fluorescent lighting over the machine tools, a motor pit and necessary crane equipment. The floor is concrete in which the heating pipes are imbedded. The heating headers are 2½ in. in diameter and feed steam to 1½-in. laterals approximately 15 in. apart. In addition to general warmth, a warm floor is expected to add materially to the comfort of the shop men who must stand and work on it for long periods of time, with consequent increase in efficiency.

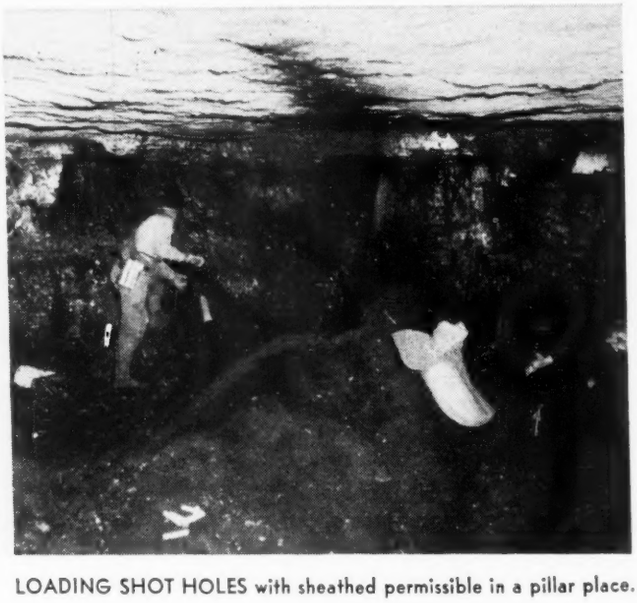
Also under construction at the time this article was prepared was a new combination office and bathhouse with facilities for as many as 200 men. The design includes concrete foundation, cement-block walls, steel-truss roof and a stoker-fired boiler to supply heat, not only for the offices and bathhouse but also for the shop.

Elevation of the Wattis preparation plant is 7,500 ft. Elevation of the No. 1 portal is 8,500 ft. The

Modern Methods Supplement Modern Equipment

RUBBER-TIRED MACHINES undercut and shear at Wattis mine, using throwaway bits in 9-ft. bars (right).

DRILLING IS DONE with single-boom rubber-tired machines.



LOADING SHOT HOLES with sheathed permissible in a pillar place.

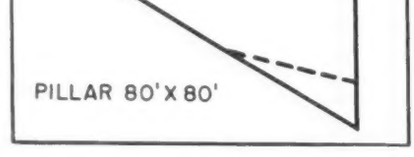


FIG. 1—MINING old diamond pillars.

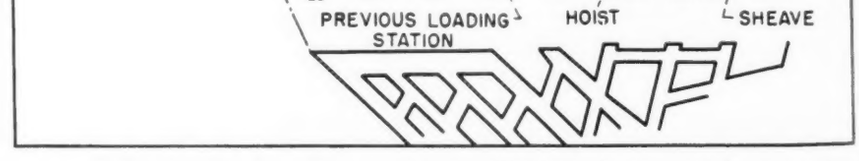


FIG. 2—NEW SECTION developed with rubber-tired haulage, showing track for car service.

BREAKER TIMBERS protect live workings in pillar areas.

EQUIPMENT LUBRICATION is done on the shift by an electrician.

connection is an incline some 6,400 ft. long down the mountainside. Trips are handled in balance by a 150-hp. Stearns-Rogers tandem-drum incline machine, which serves both the No. 1 and No. 2 portals from a location inside No. 1. Car equipment consists of new Sanford-Day drop-bottom units with S-D "Floater" antifriction wheels. Installation started about the middle of 1947 and the last 60 of the total of 160 went into service in March, 1948. The cars weigh 6,900 lb. and hold an average of 6½ tons. They are handled on the incline in trips of five—one loaded trip going down as an empty trip goes up. To improve incline operation the track is being rebuilt with 65-lb. rail on copper-salt-treated ties. At the bottom, the cars dump into a 150-ton bin, from which a pan conveyor elevates the coal to the preparation plant.

Production equipment in the No. 1 mine consists of a Joy 11BU loader, two 60D 7-ton shuttle cars with 600-amp.-hr. Exide-Ironclad batteries and a Joy rubber-tired elevating conveyor. The loader crew consists of 13 men, plus two men on main-line haulage. The work is exclusively extraction of old pillars, some of which have been standing 20 years or more. However, with good conditions and particularly a good sandstone top, the work is not too difficult and the unit is able to average 400 tons per shift.

Production units in both No. 1 and No. 2 mines are rounded out with Electric Products Co. battery-charging equipment, roller- and track-type battery stands, 5-ton Coffing cranes for charging and Sullivan car-spotting hoists.

One of the production units in No. 2 mine—the first to be installed, in fact—is made up of a 14BU loader, three 40D shuttle cars holding 6½ tons with sideboards, rubber-tired elevator and the necessary charging, changing and spotting equipment. The second unit in No. 2 mine is made up of a 11BU loader and three 60D cars, plus elevator and other auxiliaries. The 14BU and 40D cars were bought because the seam thins in spots and it was desired to have a unit that could be used in such areas. One extra car was bought for each unit for a number of reasons. One was keeping unit tonnage up in case it was necessary to haul longer than the normal distance. A second was elimination of losses resulting from possible car breakdowns. A third was availability of a unit at all times for miscellaneous work, such as delivering supplies or parts, rock-dusting with MSA "Bantam" equipment, recovery of material, and so on. As a rule rock-dusting and material delivery and recovery are done, however, on the third shift.

A Phillips transport truck also is available for moving loaders and elevators on the track. In addition, a Joy T-2 shortwall truck was acquired for moving the compressor and other equipment and heavy or bulky parts or assemblies.

Cutting and drilling are done with Sullivan 10RU rubber-tired universal machines and Sullivan CD16 rubber-tired single-boom drilling machines. The controls for all drilling operations were centralized on the boom so that one

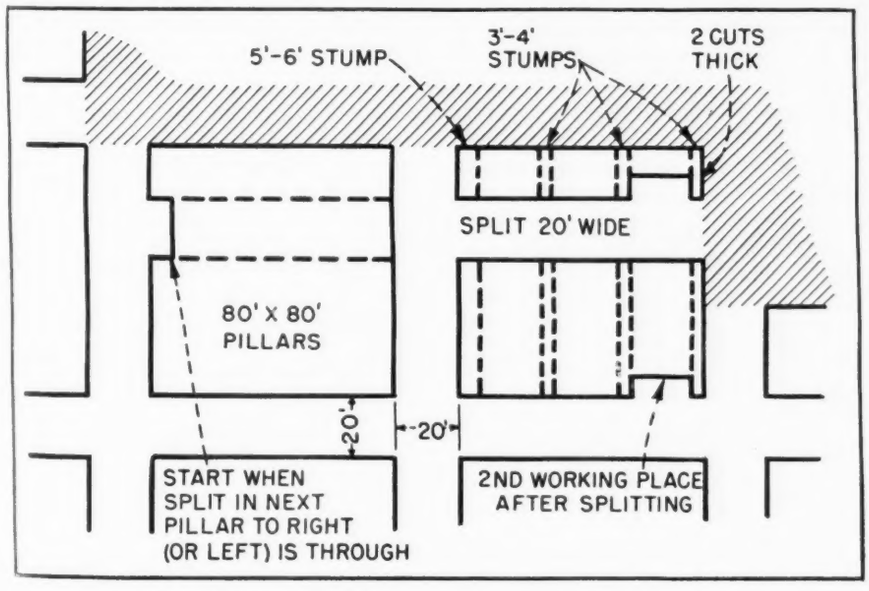
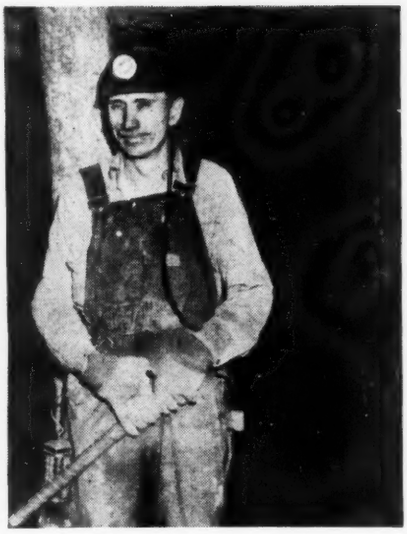


FIG. 3—USUAL METHOD of recovering square pillars in new work.

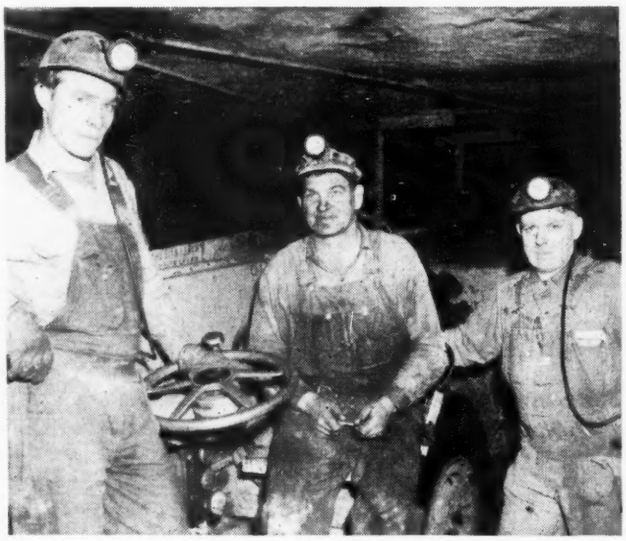
Wattis Results Reflect Management and Miner Know-How

W. J. HILLABRANT, superintendent, with Lee Shaw (left), hoistman; E. A. Shaw, master mechanic; and Wiley W. Wheeler, general mine foreman.



HAROLD OLSEN is mine foreman of No. 2 mine.

NEW DROP-BOTTOM CARS shown at the head of the incline down to the tipple hold an average of 6½ tons of coal.



QUENTIN HARRISON (left), shuttle-car operator, with John Brinkerhoff, mechanic; and William Monks, assistant foreman, No. 2.

man can operate the unit when it is in drilling position, leaving the other free to spot holes, change augers and do other necessary work. The cutters are equipped with 9-ft. Bowdil bars using Bowdil throwaway bits. Coalmaster augers and heads, with McLaughlin bits, are used on the drills. Water lines are laid into every working place and water is used on the bar while cutting. Hose connections also permit wetting down the faces before shooting and during loading, and also sprinkling of the shuttle car roads as necessary.

Maximum crews on the No. 2 units normally are made up of 15 men as follows: loader operator and helper, cutter and helper, driller and helper, three shuttle-car operators, loaderhead man, pipeman, timberman, shotfirer, handy man and foremen. Mechanics are not assigned to definite units, but three normally are on duty in all parts of the mine and, in addition to inspection and repair, have charge of the lubrication of all units, using hand guns.

In addition to the two loader crews, the No. 2 mine force normally includes four haulage men, the three mechanics previously noted, two trackmen, a fireboss and the mine foreman.

In new work, as noted, these 15-man crews are averaging 500 tons per shift. Mining in No. 2, however, includes recovery of old pillars under conditions substantially similar to those in No. 1. Since the majority of these old pillars were made in track-loader development, with places turned 60 deg. to permit fast haulage, the pillars normally are diamond-shaped. All openings then and now were driven 20 ft. wide on 100-ft. centers, with the variations normally encountered in operation.

Usual practice in mining an old diamond-shaped pillar is shown in Fig. 1. The first step is to drive across the top and knock off the point, since experience has shown that this is necessary to prevent crushing and throwing of the roof weight. Then the pillar is split about the middle and pockets are driven through the half next to the gob, about as shown. The stumps on both sides are knocked down by the loader or are shot, if necessary, to clear the way for making a fall. The final step is to drive across the bottom end, widening out toward the point, and then pocket through the solid section next to the fall,

DAY-SHIFT CREW, No. 2 mine. Supervisors include: Wm. Monks, Wm. Southworth and Dewey Freeman.

SECOND-SHIFT CREW, No. 2 mine. Supervisors include: J. R. Twedell, Geo. McDonald and Clem Gordan.

finally loading or shooting the point and the stumps.

In new work, as in old, a territory normally is set up to provide 12 to 14 working places, shooting on the shift with sheathed permissible. Since trackless mining is fairly new, only a few new sections have been developed and most of these could be termed "special." One such section is shown in Fig. 2. As indicated, the practice is to drive rooms to the boundary or other limit and take pillars on the retreat. The track commonly is turned to one side or the other, as shown, with a sidetrack for loading from the elevator on the curve. Empties are pushed in on the main line, after which the locomotive hooks to the loads and takes them out. The hoist rope is pulled back by hand and attached to the empty trip, which then is pulled back through the sidetrack switch to the elevator. After that, the trip is pulled through car by car for loading. Normally, the car-pulling hoist is set at the loaderhead and the rope is taken back to a sheave placed far enough outby to accommodate a full trip of cars.

The square pillars made in the new work usually are extracted about as shown in Fig. 3. Since the standard is driving all places 20 ft. wide on 100-ft. centers, normal pillar size is 80x80 ft. The first step is to split a pillar with a place 20 ft. wide at right angles to the room. This split is made about two cuts back from the gob edge. However, if the top is bad, the split may be made parallel to the room from the crosscut. As soon as the split is through, another split is started in the adjacent pillar, as indicated in Fig. 3. In other words, the work is synchronized to establish a rather flat pillar line.

After the pillar is split, the section next to the gob is removed by driving three pockets separated by 3- to 4-ft. stumps through it, leaving a 5- to 6-ft. stump along the room after the last pocket is through. All stumps are loaded out or shot clean to permit the top to cave clean. As soon, also, as the pocket is started on the cave side, another is started in the other part of the original pillar. Thus, after the first split is completed, a pillar normally provides two working places. Several other plans were tried before the one described was evolved as the most satisfactory. They included splitting through the middle, both narrow and wide, which resulted in too much open area, among other drawbacks.

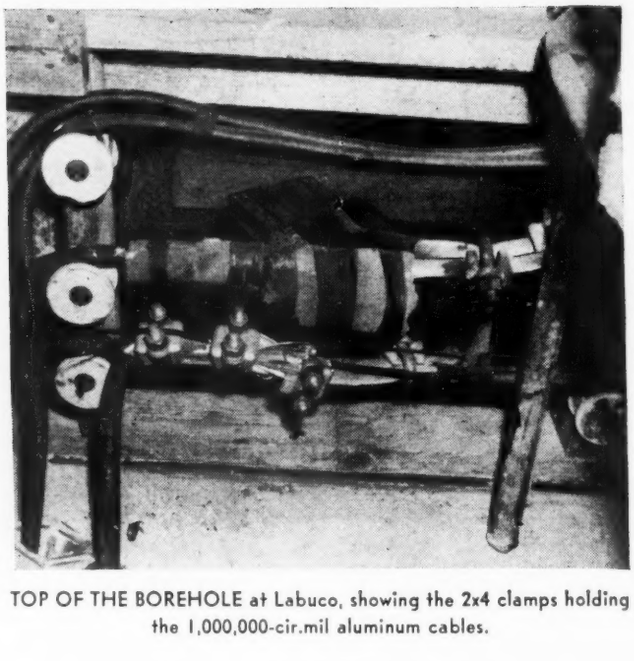
Extraction Tops 95 Percent

Care is taken, as previously pointed out, to remove or shoot all stumps and make caves immediately. Consequently, squeezing, riding and bumping are eliminated and a very high percentage of extraction is obtained—calculated at more than 95 percent. Timbering is by single posts with cap pieces. Breaker rows are set as necessary to prevent caving into the live openings. Since the bottom is soft and tends to heave, prompt caving and good timbering relieve and hold the weight and reduce trouble from this source.

Face preparation at Wattis includes both undercutting and shearing slightly to the right of center. Ten holes are drilled per place 20 ft. wide and 7 to 8 ft. high. One row is drilled at the top—two on the narrow and three on the wide side. A second row is drilled about the middle of the seam to bring down the bottom. The breaking medium is Hercules Red HC or Black Diamond BD15 sheathed permissible. Since the coal is tough and springy, the yield is about 3 tons of coal per pound of powder. Rock-dust stemming is employed.

The Lion Coal Corp. is headed by M. A. Browning. Other officials at headquarters at Ogden, Utah, are: Paul L. Wattis, vice president; A. B. Foulger, vice president and general manager; and W. J. Smeding, sales manager. The mine staff is headed by W. J. Hillabrant, superintendent. Wiley W. Wheeler is general mine foreman, and D. Batchelor is outside foreman.

TYPICAL SURFACE SUBSTATION at Labuco mine, with borehole entrance in the lean-to at the right.



TOP OF THE BOREHOLE at Labuco, showing the 2x4 clamps holding the 1,000,000-cir.mil aluminum cables.

Mining With Aluminum Cable

Weight and Cost Advantages Stimulate Use of Aluminum Cable in Coal Mining—How Three Alabama Organizations Employ the Insulated Aluminum Type in Boreholes and Elsewhere for Both High- and Low-Voltage Service

ALUMINUM CABLE is making a place for itself in an increasing number of coal mines across the country. In Alabama, as an example, the tight copper situation growing out of war and postwar demands was a major factor in experimental installations of aluminum feeder and borehole cables starting in 1947. Since that time the cost and weight advantages have resulted in the choice of aluminum for additional installations at more than 15 Alabama operations.

Aluminum conductors under the National Electrical Code are rated as having 84 percent the current-carrying capacity of copper conductors of the same size and type of insulation. This same 84 percent expresses the difference in current-carrying capacity between Type RH copper and Type R copper. Therefore, Type RH aluminum can be used size for size with Type R copper for equal current-carrying capacity. For equal voltage drop it is necessary to use aluminum two AWG sizes larger than would be required with copper (No. 6 copper to No. 4 aluminum, etc.), but it frequently is possible, where runs are short, to use aluminum and copper size for size.

Size for size, in common mining types, the weight of neoprene-insulated Type RH aluminum cable —the type almost universally installed in Alabama mines—ranges from a little over one-third to slightly more than half that of copper with rubber- and double-braid insulation (Type R). Comparing size with equivalent voltage drop, the weight saving is somewhat reduced but still is in the neighborhood of 40 to 50 percent. Table I compares ampere capacities, weights and resistances of insulated copper and aluminum cables in sizes commonly used in coal mining. Cost savings, on the basis of equivalent current-carrying capacity, range from around one-fifth to more than one-third.

Alabama users of aluminum feeder include the Black Creek Coal & Coke Co. Since August, 1947, this company has purchased over 42,000 ft. of 2/0, 3/0 and 4/0 U. S. Rubber aluminum cable, 600-volt neoprene insulation, for a.c. and d.c. distribution. Operating at Trafford, Ala., Black Creek is mining the Black Creek seam, some 22 in. thick. The product is used for coking. Hand loading is the practice and the coal is shot off the solid and gathered to the main line by mules. Some 22 to 24 coal drills rated at 2.7 hp. each are in service, along with a main-line locomotive. Most of the drills and the locomotive are supplied with 250-volt d.c. power from a 150-kw. set on the surface. Underground pumps are operated on a.c., with 2,300-volt cables to transformer stations.

At present the d.c. distribution at Black Creek consists of 4/0 trolley wire with 4/0 and 2/0 feeder in parallel (positive and return) to the working sections. The cables are hung on insulated spools on pins in the rib. In addition to the cost and weight advantages, the neoprene jacket provides an additional benefit at Black Creek in preventing not only shock to men but also to the mules used for gathering

Table I—Comparison of the Current-Carrying Capacity, Weight and Resistance of Selected Copper and Aluminum Wires and Cables

	Open-Air Current-Carrying Capacity, Amperes		Weight Per 1,000 Ft., Pounds		Resistance 1,000 Ft., 25 Deg. C., Ohms	
	R Copper RH	Aluminum	R Copper RH	Aluminum	Copper	Aluminum
2/0	225	222	541	274	0.0842	0.134
4/0	300	302	816	380	0.0525	0.0843
500,000	515	520	1,831	787	0.0222	0.0357
750,000	655	660	2,716	1,129	0.0148	0.0238
1,000,000	780	785	3,546	1,437	0.0111	0.0178
1,250,000	890	895	4,400	1,699	0.00890	0.0145

Reduced weight also has been a material advantage in view of the necessity for frequent changing of the feeder cables because of rapid exhaustion of working territories growing out of the thinness of the coal. A wire crew consists of two men and the number was not changed when aluminum cable was adopted. However, the time the crews have to spend in extending the drill circuits in the entries was reduced approximately 50 percent as a result of the ease with which the men can move the lighter cable. The cable is installed in sections, the shortest being 500 ft. for the 2/0. For runs of less than 500 ft., drill-type trailing cables are used.

Old A.C. System Replaced

Some 10,760 ft. of 3/0 19-strand U.S. Rubber neoprene-insulated cable has been installed at two mines of the Boothton Coal Mining Co., Boothton, Ala., for 2,300-volt underground distribution. The Boothton mines are slope operations and all equipment is operated on a.c. power. The mines have been in operation a number of years and went under new management in 1944. The original 2,300-volt system, using a variety of cable types, mostly lead-covered, began to give considerable trouble. Consequently, an early job of the new management was installation of a new system.

New cable included both copper and aluminum, with the latter in the majority at two operations. Insulation for 5,000 volts was specified and the aluminum cables were laid on the bottom in the air courses with no special protection.

Boothton No. 4 mine—one of the two in which aluminum cable is installed—is served by a 2,500-ft. run of 1/0 copper—three conductors in parallel. A branch of this run (also copper) goes up through a borehole to serve the upper No. 3 mine. In No. 4 mine, a run of approximately 1,000 ft. of aluminum cable, jacketed as noted with neoprene for 5,000 volts, takes off from the copper to serve the active workings. With three cables in parallel, total length of aluminum cable installed is 3,000 ft. (three 1,000-ft. lengths of 3/0).

Some 7,800 ft. of 3/0 neoprene-jacketed aluminum is installed from the top of the borehole in No. 3 mine. Length of the run is, naturally, 2,600 ft. The first aluminum went into service at the Boothton mines early in 1947. A few blow-ups have occurred since that time. Only two, however, have been experienced for reasons other than falls or moving. The latter, in the opinion of the management, should be kept to a minimum.

Alabama users of insulated aluminum borehole cables include the Alabama By-Products Corp. The first ABC installation was made at the company's Labuco mine in August, 1947. Labuco, in common with other ABC mines, normally is supplied with 275-volt d.c. power through boreholes at intervals of 3,000 to 4,000 ft. Boreholes are drilled and sets moved or added on the surface in step with mining.

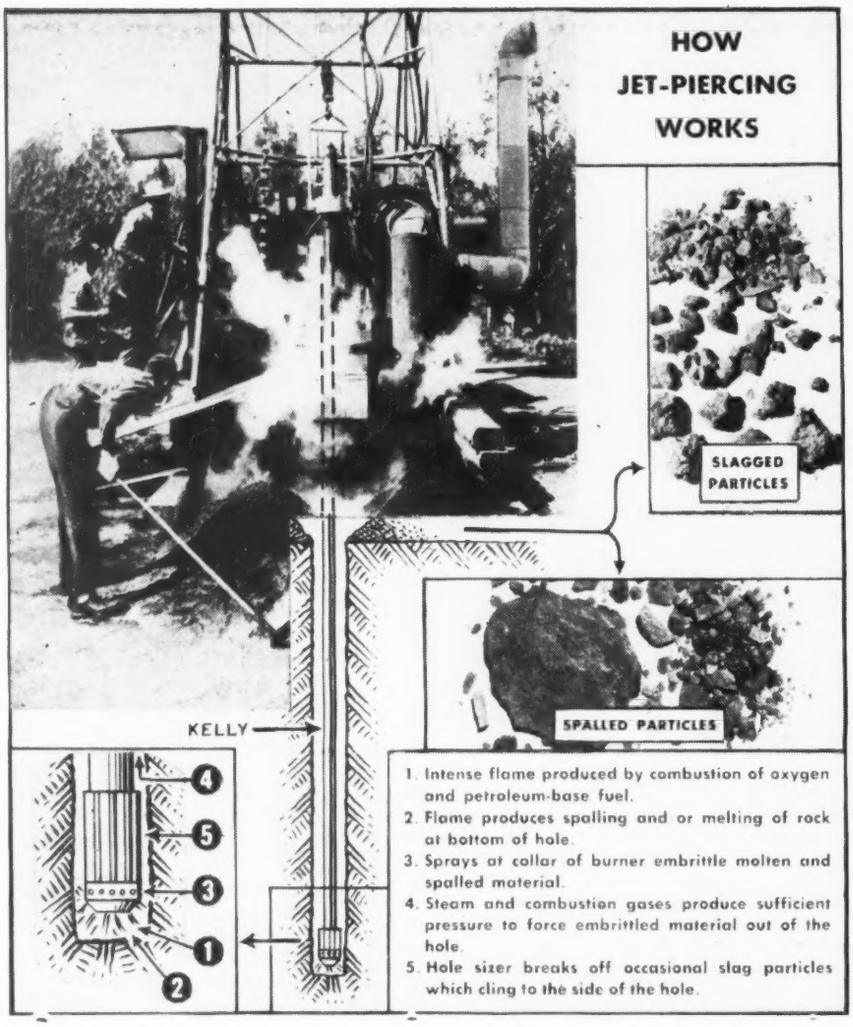
Aluminum was first selected for new boreholes because it was easier to obtain. Its lightness, ease of handling and lower cost, however, made it so satisfactory that it is being specified for all new holes for which cable must be bought. The Labuco installation, also U. S. Rubber, takes power down from two 150-kw. m.b. sets operating in parallel with each other and with all other sets at or in the mine. The sets and accompanying switchgear are housed in a semi-portable galvanized steel house set next to the borehole.

Borehole Suspension Simplified

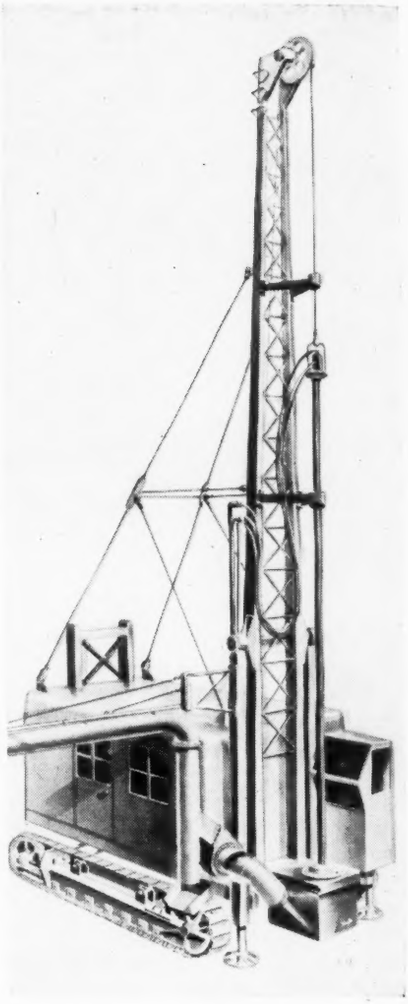
Depth of the Labuco borehole is approximately 300 ft. The hole was drilled with a diameter of 8 in. and is cased with 5-in. pipe grouted in place. Two 1,000,000-cir.mil 600-volt neoprene-jacketed aluminum cables—one positive and one negative—are suspended in the hole. The suspension consists of 2x4's clamped around the cables by means of bolts and resting on a concrete collar (see accompanying illustration). The reduced weight of the cables permitted use of this rather simple suspension.

A second borehole installation was completed at the Bradford mine in May, 1948. At this mine, also, the practice is to put down holes every 3,000 or 4,000 ft. As at Labuco, hole diameter was 8 in. and casing diameter is 5 in., also grouted in place. Depth is approximately 290 ft. and, as at Labuco, the positive and negative are, respectively, 1,000,000-cir.mil neoprene-insulated aluminum cables with 2x4 suspension.

In addition to the borehole cables, Alabama By-Products also is extending aluminum use with the purchase of 2,500 ft. of 750,000-cir.mil feeder for Bradford and 2,000 ft. of 1,000,000-cir.-mil, also 600-volt insulated, for Praco mine.


HOW
JET-PIERCING
WORKS
SLAGGED
PARTICLES
SPALLED PARTICLES
KELLY
1. Intense flame produced by combustion of oxygen and petroleum-base fuel.
2. Flame produces spalling and or melting of rock at bottom of hole.
3. Sprays at collar of burner embrittle molten and spalled material.
4. Steam and combustion gases produce sufficient pressure to force embrittled material out of the hole.
5. Hole sizer breaks off occasional slag particles which cling to the side of the hole.

JET-PIERCING TESTS were made with this experimental rig at the Reserve Mining Co. property, Babbitt, Minn. An intense flame from a multiple-port burner at the bottom of a 30-ft. revolving blowpipe spalls or melts rock in the hole.



COMMERCIAL RIG for jet-piercing now under construction, as it has been conceived by the artist.

Jet-Piercing–New Stripping Aid?

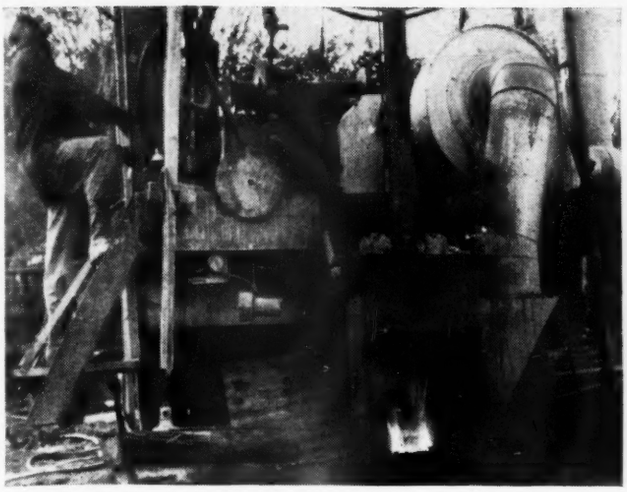
Jet-Piercing Uses Flame to Make Vertical Blast Holes—Experimental Tests in Mesabi Iron Range Appear Promising—Possible Application to Coal Stripping Must Await Further Tests With Sandstone and Limestone Formations

CAN COAL STRIPPERS reduce drilling costs by burning their way through the rock? This question becomes pertinent as a result of (1) the development of jet-piercing into an apparently practical process on the Iron Range of Minnesota and (2) the increase in depth of overburden and the hardness and thickness of the rock that has accompanied the expansion of coal stripping in recent years. The nature of the rock problem now being encountered in stripping operations is indicated by reports that operators are having to skip as much as a mile of outcrop where thick, hard sandstone ledges come in over the coal.

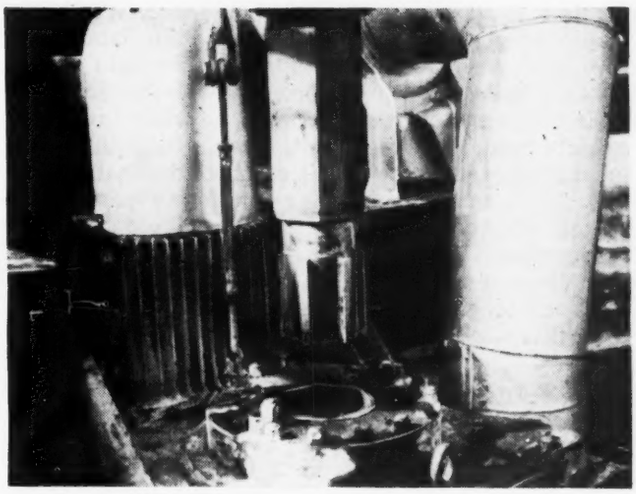
While the material is, of course, generally different, the problem on the Iron Range was essentially that now facing many strip operators: hardness making regular churn drilling very costly, if not impossible. Experience with jet-piercing has indicated that it can be applied to material almost impossible for a churn drill to touch and that in competition with the churn drill it can make holes several times faster.

The first experiments with jet-piercing were conducted over 10 years ago at the Soudan mine in Minnesota. The next field tests were made at Babbitt, Minn., in 1941, when the experimental program was brought to an end by the war. They were resumed at Babbitt in 1946 and 1947 by The Linde Air Products Co., sponsor of the development, and results since that time in five rock and ore formations in Minnesota, Wisconsin and Michigan have further demonstrated

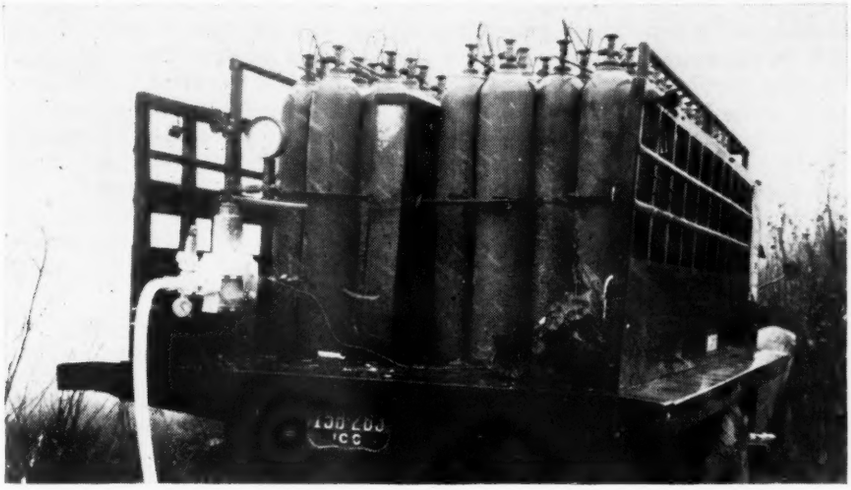
Based on material derived from reports in *Engineering & Mining Journal* (November, 1946, and March, 1948).



JET-PIERCING is a thermochemical rather than a mechanical process and consists of directing a flame produced by burning oxygen and fuel in a blowpipe against the material to be pierced.



THE BLOWPIPE is rotated by a turntable containing a hexagonal opening which engages a hexagonal sliding collar on the blowpipe. The blades size the hole and break up large particles of slag.



MANIFOLD CYLINDERS, brought to site of the hole-piercing operations on truck, proved satisfactory as a means of supplying oxygen for the field tests at Babbitt.

Table I—Over-All Performance Data at Babbitt, Minn.

Number of holes	38
Total footage	1,180
Total hours burning time	62.8
Piercing speed, ft. per hour	18.9

Table II—Average Operating Conditions for Tests at Babbitt

OXYGEN	
Pressure, lb. per square inch	225
Consumption, cu. ft. per hour	9,460
FUEL	
Pressure, lb. per square inch	150-175
Consumption, lb. per hour	281
WATER	
Pressure, lb. per square inch	60-70
Consumption, g.p.h.	656

the possibilities of the process and have led to the development of a commercial jet-piercing rig.

Since, however, the process still is in the development stage and all effort is being concentrated on completion of the test work, study of the application of jet-piercing to other types of mining, such as coal stripping, assuming that further investigation indicates good possibilities, must await completion of the Iron Range program.

Jet-piercing is a thermochemical rather than a mechanical process and consists of directing a flame produced by burning oxygen and a petroleum-base fuel in a special blowpipe against the material to be pierced. The intense heat of the flame (about 4,000 deg. F.) and the pressure of the burning gases fuse and/or spall their way through the rock. The freed particles of rock are forced up past a rotating water spray, located above the burner in the blowpipe, where they are quenched, embrittled and broken into fine particles and small chips by a revolving reamer-like hole sizer. The fine particles (sometimes cinders) and chips are expelled at the top of the hole by the exhaust gases and the steam generated by the contact of the water spray with the high-temperature particles and gases. Approximately 50 percent of the particles discharged are less than 1/16 in. in diameter. However, flakes with single dimensions of 1 in. are easily discharged from the hole. The continual exposure of new rock

Table III—Oxygen, Fuel Used by Experimental Rig (3½-In. Holes)

Material Pierced	Total Footage	Speed, Ft. per Hour	Average Consumption — Oxygen, Cu. Ft. per Hour	Fuel, Lb. per Hour	Water, G.P.H.
Magnetite	174	8.5	2,600	100	300
Hematite	97	14.0	2,570	109	300
Dolomitic limestone	103	31.5	2,500	72	300
Coarse granite	5	20.8	2,800	65	300
Quartzite	158	28.4	2,260	80	300

Test Results Indicate Jet-Piercing Possibilities

surface to the flame facilitates the rapid advance of the jet-piercing tip. The steam and water rapidly cool the walls of the hole.

It has been reported that only a slight amount of fusion takes place in the hole and that when it occurs the fused material is discharged almost as soon as it is formed. Earlier experiments had indicated that there was considerable fusion. As a consequence, "fusion-piercing" was the name first applied to the process. However, in the light of more recent discoveries, "jet-piercing" has been adopted as a more suitable term.

The 1946 experiments, when the process was still known as fusion-piercing and the mixing of a fluxing media with the petroleum-base fuel was considered a necessity, involved piercing 6-in. 30-ft.-deep vertical blast holes in hard taconite in the Mesabi Iron Range of Minnesota. Taconite, in iron country parlance, includes any grade of extremely hard, lean iron ore with the iron either banded or well disseminated and consisting of magnetite or hematite or a combination of the two within the same orebody. The dense, banded rock analyzes 30-percent magnetically recoverable iron.

Works on Taconite

The taconite at the Reserve Mining Co. operation, Babbitt, Minn., where part of the experiments were conducted, is extremely hard, consisting of thin to medium bands of magnetite, slates and cherts (impure flint-like rocks) interspersed with magnetite. Other constituents are quartzite, pyroxene (igneous rocks) amphibole (hornblende) minerals, and ferruginous and aluminous cherts. Churn drilling, when last attempted in the early 20's, penetrated the ore at an average rate of approximately 1 ft. per hour. Jet-piercing, in contrast, has penetrated the rock at an average rate of about 10 ft. per hour, the variations ranging from a few to as much as 17 ft. per hour for short periods.

Laboratory tests indicate that magnetite melts at approximately 2,790 deg. F. and silica at 3,090 deg. F. Taconites melt between 2,190 and 2,880 deg. F., but with various fluxing agents this range can be reduced to 1,800 and 2,280 deg. F.

Spalling in cherts largely results from the conversion of alpha quartz to beta quartz at 1,100 deg. F., at which temperature there is a great expansion in volume. Since only the surface of the rock exposed to the flame expands, it breaks loose in thin chips with considerable force from the cooler underlying rock. Cracks extending radially from the hole occur as a result of thermal stresses produced in the orebody by the flame. In blasting, these cracks promote better fragmentation.

Additional piercing tests (Tables I and II) were conducted at Babbitt, Minn., in 1947. Guided by the results of the 1946 tests, the blowpipe was redesigned to make it possible to omit the fluxing agent. Thus the step of mixing the flux and the fuel was eliminated.

Nearly 40 holes were pierced in five locations at Babbitt in 1947, covering every representative formation on the property. Holes were put down in solid ledge, in cracked and fissured rock, near faces that had been blasted, under more than 25 ft. of water and through overburden consisting of clay and glacial drift 1 to 3 ft. thick. Holes pierced averaged 9 in. in diameter and 31 ft. deep. Of the 1,180 ft. of hole, over 400 ft. was pierced with the employees of the Reserve Mining Co. operating the controls.

A smaller rig only partially equipped with instruments but capable of piercing holes at any angle from horizontal to vertical also was engaged in experimental work in 1947. It consisted of a blowpipe mounted on a standard wagon drill, with the power unit and auxiliaries carried on a light truck. The 14-ft. blowpipe produced a 3½-in. diameter hole. Test results are summarized in Table III. High-grade quartzite, dolomite (limestone containing magnesium carbonate), low-grade iron ore and common granite were among the formations tested. Holes inclined at 30 deg. to the horizontal were made in dolomitic limestone at an average of 35 ft. per hour.

The larger experimental unit for piercing 9-in.-diameter vertical holes resembles a portable oil-well drill and is mounted on a truck. The 46-ft. tubular steel mast, which accommodates a 30-ft. blowpipe, is raised by two hydraulic pistons operated by a pump driven by a power take-off on the truck. The blowpipe, which replaces the "kelley" in the drill rig, is suspended from the headsheave by a cable attached to a single-drum winch. A slow-speed motor permits the operator to make close vertical adjustments to the blowpipe during piercing. A high-speed motor is used for quickly raising the blowpipe for inspection or after the hole has been finished.

In piercing, the blowpipe is rotated at a constant speed by a turntable with a hexagonal opening that engages a sliding hexagonal collar on the blowpipe. Three longitudinal flutes on the surface of the stem and inside the adapter permit the two units to mesh during rotation and also permit free vertical motion of the blowpipe. The principal work of the reamer, an 8-in.-long shell with blades faced with Stellite and mounted just above the burner tip and the water ports, is to grind the larger particles and also size the hole. The steam and gases from the hole are drawn off by an exhaust fan and discharged a short distance from the rig. The slagged or spalled particles are deposited about the collar of the hole and generally removed by the operator's helper.

Water, oxygen and fuel are piped from the top of the 30-ft. 4½-in. (outside-diameter) blowpipe to the multiple-port burner. The water is for the sprays. It also helps keep the burner tip cool. In addition to protecting the tip, the water quenches and disintegrates the molten and spalled material, and produces steam which helps carry the particles out of the hole. Water consumption in some tests, as shown in Table II, was about 656 g.p.h.

Oxygen and a petroleum-base fuel are burned to produce the high-temperature flame required for piercing. The flame's maximum effectiveness is 4 to 6 in. from the tip of the burner. Before igniting the burner, rotation is begun and the control valves for the water, oxygen and fuel are adjusted. The combined jets of oxygen and fuel are ignited by passing a lighted oily rag across the burner tip. When it is necessary to collar the hole, a short hinged hot-top or collar of fire-resistant material is clamped loosely around the flame area to direct the flame at the rock.

Equipment Easy to Operate

The operating technique of jet-piercing is easy to master, it is stated. It consists primarily of keeping a close watch on gages and an attentive ear on the hole, since the effectiveness of the flame, as in both arc- and oxy-acetylene welding, can be judged, in a measure, by the sound. If, for example, a cherty band is encountered, rapid spalling will take place and the distance between the tip and the rock face will tend to increase and produce chambering. This will cause the gases to

emit a characteristic sound that will warn the operator of changing conditions. Increased tension in the cable also will be noticed because the reamer or grinder will not be encountering as much slag, and the gases below the burner tip will exert less pressure or buoyant effect upon the blowpipe. The operator, of course, speeds up the winch to advance the tip as fast as the spalling takes place.

If a hard band of magnetite is met, piercing will slow up slightly since the material will have to be melted rather than spalled. The operator is warned of this because again the burner tip emits a different sound that indicates closer proximity of the tip to the face. Also, there will be less tension in the cable because the reamer probably will be encountering more slag, and the gases below the tip will exert more buoyancy on the blowpipe. To improve burning conditions, the operator raises the blowpipe slightly. In piercing, it is desirable to advance the hole by spalling whenever possible because of the lower fuel consumption and the faster penetration.

Functions Under Water

Jet-piercing also works under water. In one instance the blowpipe was ignited and lowered into a hole containing 15 ft. of water. This head of water did not hinder operations because the pressure of the oxygen and fuel was maintained high enough to prevent back pressure from extinguishing the flame. The tip was lowered through the water to the bottom of the hole where it proceeded to pierce normally. The water was soon expelled by the steam and gas pressures developed.

Hole-volume measurements of jet-pierced holes indicate that on the basis of explosive capacity they are comparable to 9-in. churn-drilled holes. However, a suitable loading technique remains to be evolved.

Blast holes can be readily chambered with the jet. Chambers 15 to 20 in. in diameter by 5 to 24 in. long have been produced by holding the blowpipe at a fixed level for several minutes. Through the development of specially-designed nozzles it is expected that the production of chambers of variable size and shape will become an important phase of piercing operations.

Temperature of the water standing in the bottom of several holes immediately after piercing was recorded at 150 to 175 deg. F. Waterflooding or an adequate time lag must precede the loading of jet-pierced holes with explosives.

One method of distributing the oxygen in the field is by truck carrying the standard steel cylinders holding 244 cu.ft. at 2,200 lb. per square inch at 70 deg. F. and equipped with a manifold for tapping five to ten cylinders at once. For large users, "Driox" liquid oxygen may be shipped in railroad tank cars or tank trucks and pumped into storage tanks. Where it is neither feasible nor economical to pipe gaseous oxygen to the field equipment, it may be carried to the piercing equipment at a 2,200-lb. pressure in mobile "Cascade" oxygen units.

The first commercial jet-piercing rig is being jointly engineered by The Bucyrus-Erie Co. and the Linde company. As a result of the 1947 field tests, the rig will have full crawler mounting, permitting most hole-to-hole moves to be made with the mast erect. Powered leveling jacks will reduce set-up time after a move. Such a rig will permit hole-to-hole moves and set-ups in less than 30 minutes, it is stated. Based on an average piercing speed of 20 to 25 ft. per hour, the rig should be capable of at least 100 to 150 ft. of hole per shift. It is believed that two rigs can be run by two operators and one helper.

In coal stripping, it is no secret that the bottleneck at most operations is the slowness with which the overburden is prepared. If jet-piercing, as now appears possible, can speed up the operation and permit better fragmentation, savings should be possible not only in the cost of drilling and shooting but also in higher production per stripping unit.

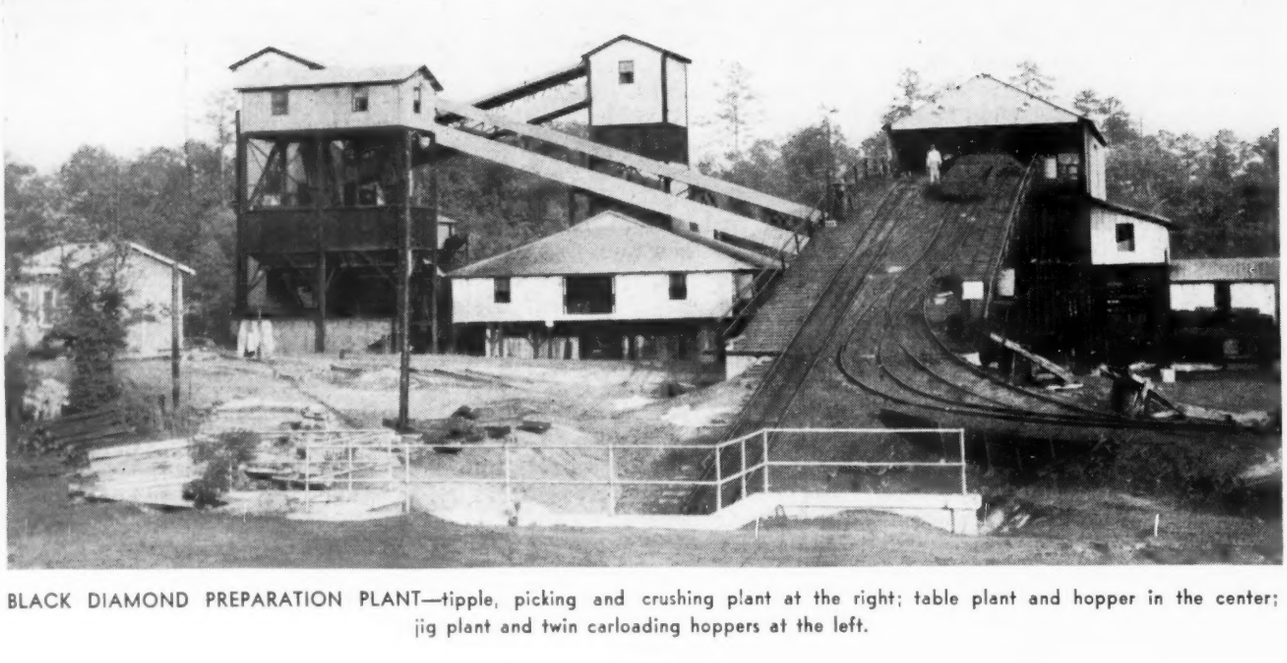
The task of preparing overburden for the coal-stripping industry is a big one. In 1947, approximately 135,000,000 tons of bituminous and about 12,604,000 tons of anthracite coal was stripped. The overburden moved may well have been 12 times that tonnage. In some localities this overburden contains a goodly quantity of limestone and sandstone. Both are tough formations to handle, especially if either occurs next to the coal and there is no opportunity to resort to sidewall drilling between the coal and the hard rock strata. One Illinois stripper, for example, must contend with 5 to 10 ft. of limestone immediately over a 4- to 7-ft. seam of coal, followed by 8 to 10 ft. of shale and 8 to 10 ft. of sandstone, shale and surface material. At an Ohio operation, the overburden, starting at the coal, is as follows: 6 ft. of shale, "runner rock," 16 ft. of sandstone and shale, and 20 ft. of limestone, followed by more sandstone, shale and surface material.

Two anthracite strippings also provide examples of conditions that make present methods of vertical drilling slow and costly. Operating data from one operation doing bench stripping, where 14 9-in. churn drills are in service, reveal that over a two-year period the average performance per drill was 26.6 ft. of hole per seven-hour shift. Overburden blasted per drill shift averaged 203 cu.yd. in rock strata consisting of 46 percent hard sandstone, 18 percent shale and 36 percent slate. In somewhat softer overburden the drills averaged 40.8 ft. of hole per seven-hour shift. The machines operated on a tool travel of 38 to 48 in. at 52 r.p.m., producing a theoretical energy equal to 1,040,000 ft.-lb. per minute. A blacksmith and one helper sharpened the drill bits at a rate of three an hour.

Drilling speed at the second anthracite operation, also using 9-in. churn drills, averaged 47.6 ft. per drill per seven hours over 6,724 drill shifts. Records also showed that each bit averaged 55 ft. of drilling before being resharpened, and that each drill used one bit per shift when drilling in medium sandstone and three bits per shift when drilling in conglomerate. It was reported that a blacksmith and two helpers averaged sharpening 30 bits in seven hours.

Piercing for Coal Next?

Jet-piercing, available data indicate, offers the possibility of a substantial improvement in cost under conditions such as those outlined in the foregoing paragraphs. Problems involved in its adaptation to coal stripping include depth of hole, which at present is limited by the height of the mast on the rig, which in turn limits the length of the blowpipe. Hole diameter, test results on the Iron Range indicate, corresponds with the needs of coal stripping and chambering can be done easily if necessary. The necessity for water flooding or a cooling period before shooting introduces some problems in charging. In the light of experience to date, however, none of these problems are insuperable, while the possible benefits are substantial.



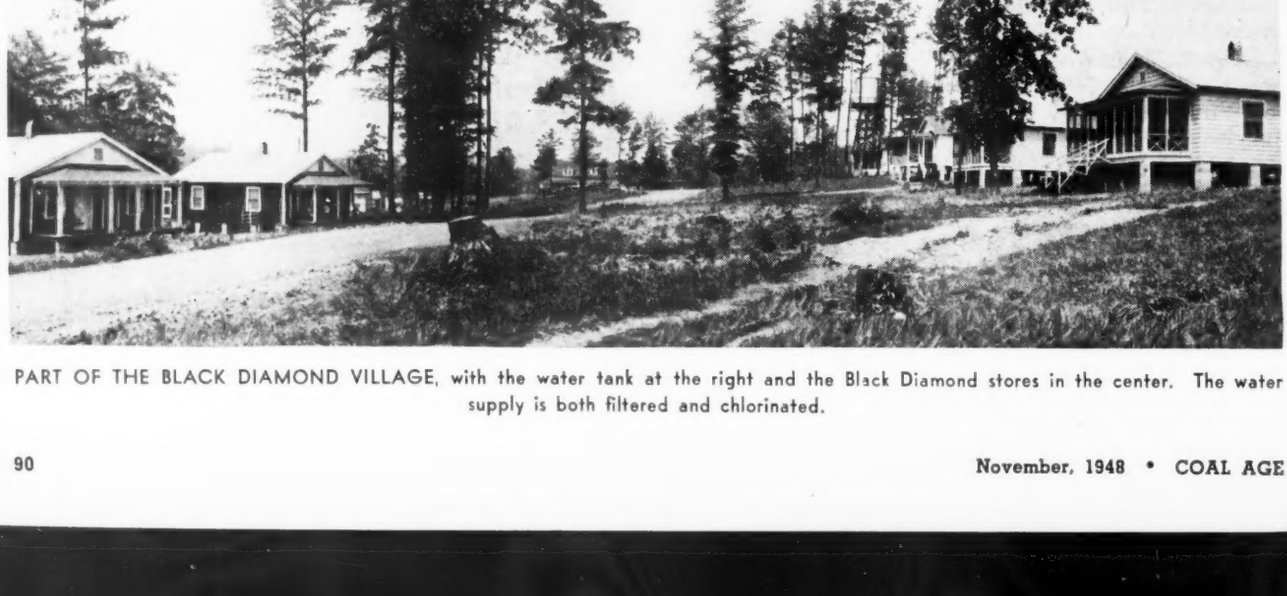
BLACK DIAMOND PREPARATION PLANT—tipple, picking and crushing plant at the right; table plant and hopper in the center; jig plant and twin carloading hoppers at the left.

New Black Diamond

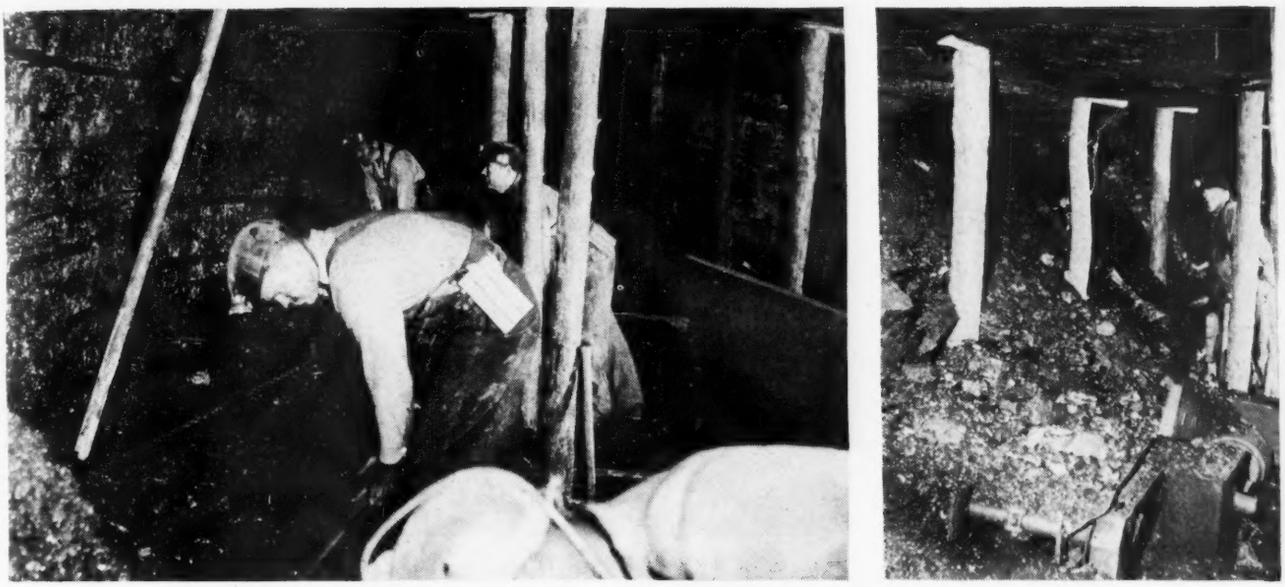
Built for Quality Production, New Black Diamond Mine Is Served by Dual Slopes, Chain Conveyors Underground, Jigs and Tables on the Surface and Modern Community Facilities, Including Special Women's Store

ADDING SIGNIFICANTLY to Alabama's production of quality steam and coking coal, the new Black Diamond operation of the Black Diamond Coal Mining Co., Black Diamond, Ala., comprises a new mine, a new town with modern mercantile store, post office and other facilities, and a new washing plant featuring a high degree of simplicity along with precision cleaning.

The Black Diamond organization, with C. S. Bissell as president and C. S. Blair as vice president in charge of operations and general manager, has had considerable experience in opening new properties over the years, and the facilities at the new Black Diamond plant reflect that experience in full. While the cost of materials and construc-



PART OF THE BLACK DIAMOND VILLAGE, with the water tank at the right and the Black Diamond stores in the center. The water supply is both filtered and chlorinated.



UNDERGROUND AT BLACK DIAMOND. Final clean-up and cutting of the face is shown at the left. Note backboards behind the face conveyor, against which the coal is shot as at the right.

tion, as well as difficulty in obtaining said materials, has so far limited the number of houses to 49, they were built for comfort, convenience and appearance. The long waiting list of employees that could not be accommodated is evidence of the high regard in which they are held by the miners. Community facilities also include a modern water system approved by both state and county authorities. It includes both chlorination and filtering through activated charcoal.

Mercantile stores are a particular interest of Mr. Blair and the standing of the Black Diamond store, as well as others of the company, is reflected in substantial patronage by people from the outside. In addition to the general stocks of groceries, wearing apparel, furniture and other items generally in demand, all Black Diamond establishments feature special women's stores. While usually in the same buildings as the general stores, the women's stores are separate establishments fitted up and stocked to meet the special needs and desires of women in clothing, lingerie, cosmetics, and so on. Only quality merchandise is stocked and sold by special sales people. The manager and buyer for these women's stores is Miss Helen Cardwell, daughter of J. M. Cardwell, Black Diamond superintendent.

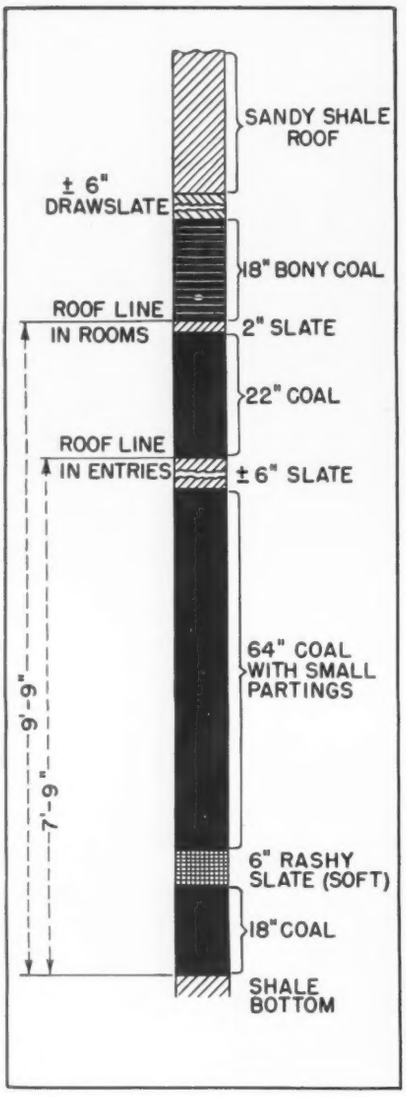
BLACK DIAMOND GENERAL STORE, with the Women's Economy Store—a feature of all Black Diamond units—at the left.

In addition to Mr. Cardwell, officials at Black Diamond include W. B. Patterson, general mine foreman; George Johnson, washer foreman, and T. T. Snow, chief electrician. Ivan W. Miller is general superintendent for all Black Diamond properties and Robert J. Blair is assistant. David Pickett is safety director.

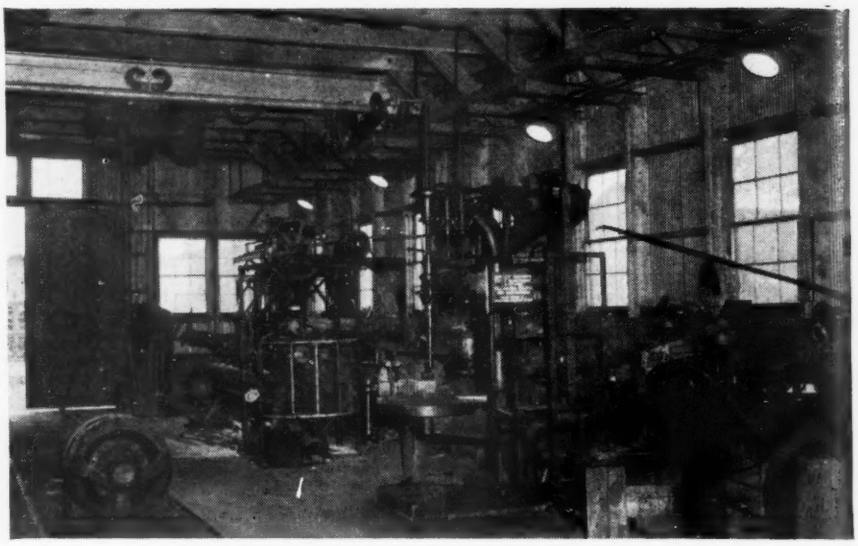
Area Required Development

The new Black Diamond mine is another development in the Blue Creek seam in the Blue Creek Basin. The location is approximately three miles south of Johns and about the same distance southwest of the Blue Creek operation in the same seam, opened up by the Black Diamond organization in 1940. In contrast to the older mines in the Blue Creek seam, such as Johns, Adger and Sumter, all of which were developed in the latter part of the last century from the north outcrop, which is paralleled by the railroad, the new mine, on the south side of the basin, necessitated the building of 3½ miles of standard-gage railroad, from Chinn on the Louisville & Nashville main line parallel to the southern outcrop to the site selected for the No. 2 slope. The area bordering the southern outcrop was a wild, rough, unsettled and heavily timbered region. Deer and wild turkey still are seen occasionally even up to the present time. There were no roads across the "mountain," or high ridge, down the center of the basin throughout its length to provide an outlet to the railroad to the north, and the en-

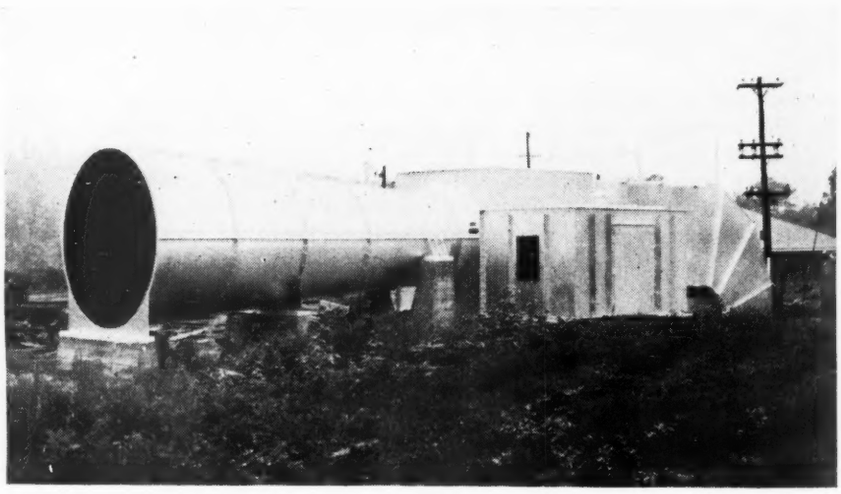
Development Sets the Stage for Efficient Production



TYPICAL COAL SECTION, Black Diamond.



SHOP EQUIPMENT includes a 5-ton mine-made traveling crane.



NEW FAN VENTILATES both sides of the mine and replaced two smaller centrifugals.

tire area was almost inaccessible for any type of conveyance when Black Diamond began development.

As a result of these conditions, the first task in development, coordinated with construction of the power line, was the building of a hard-surfaced road from Johns to the new property for transportation of men and materials. This road, which has now been developed into a first-class highway, served later for truck haulage of coal to the Johns washer during the development of both No. 1 and No. 2 slopes prior to the completion of the railroad a year later.

Following completion of the power line, unwatering of the old No. 1 slope was started, as this location had been selected previously as the most favorable site for the beginning of the new operation. This slope, driven down some 400 ft., was an old prospect opened up by Henry F. DeBardeleben, one of the early pioneers of the Birmingham district, in the late 80's and several years before the L. & N. R.R. was extended into this area.

60-Year-Old Slope Used

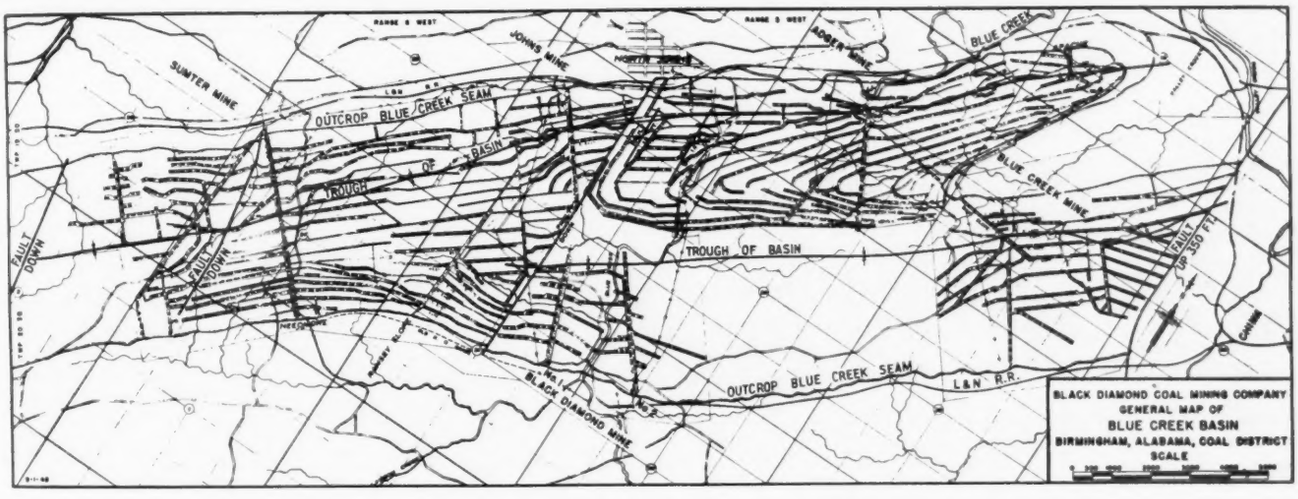
The slope when unwatered was found in perfect condition, 20 ft. wide, 6 ft. high and with perfectly straight ribs. The roof was supported throughout its entire length by hand-hewn white-oak square sets, consisting of 10x10-in. mud sills and collars with four rows of posts expertly dovetailed into the sills and collars and dividing the slope into three compartments. In view of the favorable conditions found, it was promptly decided to continue this slope, which has now been developed into the No. 1 operation. This old slope, when unwatered, provided a favorable picture of the good mining practice in effect some 60 years ago, using hand power only.

Production from the Black Diamond mine began shortly after the unwatering of the old slope and in advance of the construction of the railroad spur into the property. The coal, as noted, was trucked across the hill to the central preparation plant at Johns for washing. In January, 1944, dumping in Black Diamond's own plant got under way, the raw coal being loaded in railroad cars at the No. 2 tipple and shipped to the Johns washer. This practice was continued until the new preparation plant at Black Diamond was completed in the fall of 1947. Meantime, opening of the No. 2 slope, directly on the railroad, was begun in 1944 and at the time this article was written the two slopes had been connected underground in the bottom of the basin to facilitate haulage and ventilation.

The Blue Creek seam being recovered by Black Diamond is one of the outstanding coking-coal producers in Alabama. Production at

OLD TIMBERING as disclosed in the unwatering of No. 1 slope.

MINE-MADE, this winch truck can carry 4 tons and pull 10 tons.



GENERAL MAP of the Blue Creek basin—site of the new Black Diamond mine.

the time the data were gathered for this article was approximately 1,200 tons per day of two shifts. The preparation plant, however, can handle coal at a maximum rate of 1,000 tons per single shift. Employment at the present production rate is approximately 220 men, including all surface and office personnel.

The Blue Creek coal, as previously noted, occurs in the form of a basin and Black Diamond is developing from the south outcrop to the bottom. Pitch at the outcrop is about 25 percent, flattening out to level at the bottom, where the maximum thickness of the cover is approximately 600 ft. Entries are being turned both right and left and driven out on a gradient of 2½ to 5 percent in favor of the loads. Rooms are mined up the pitch. When development to the bottom of the basin is completed, room pillars will be recovered on the retreat. Thus, large production is possible to offset the cost of sinking and development, and the cover is kept intact so that it is unnecessary to fight water all the way. Only when final retreat is started will much water be admitted to the mine and it will largely be left behind. Therefore, pumping will be necessary only to keep the level down and the entire inflow will not have to be handled, in addition to the fact that the workings will be kept dry.

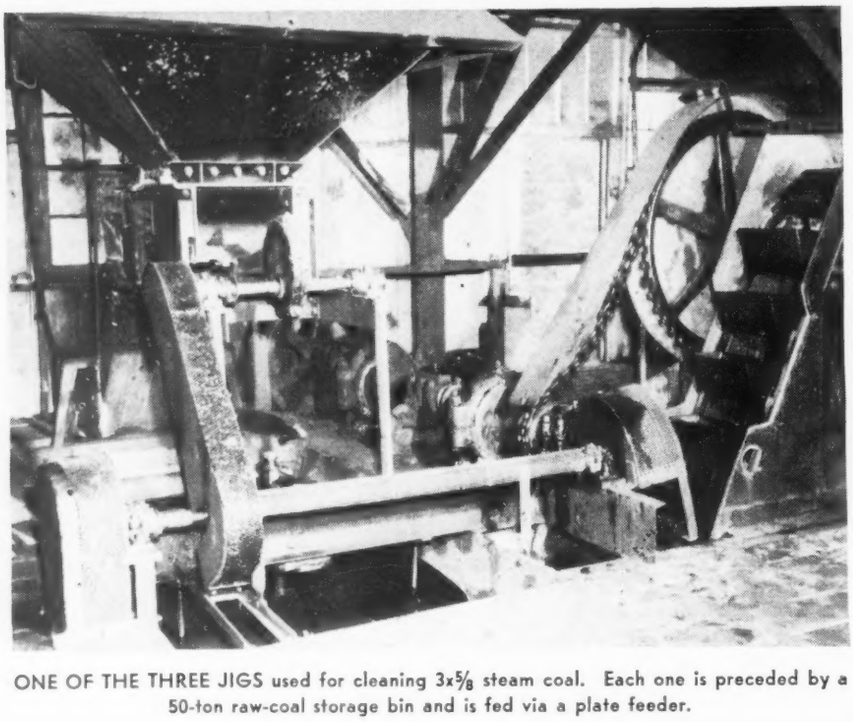
Seam 9 to 10 Ft. Thick

Average total thickness of the Blue Creek seam at Black Diamond is between 9 and 10 ft. The coal is overlaid by approximately 2 ft. of bony coal and drawslate, followed by a hard sandy-slate roof. Because of the draw, about 2 ft. of coal is left in the top in entry work. In rooms, however, the drawslate is posted and the entire seam recovered.

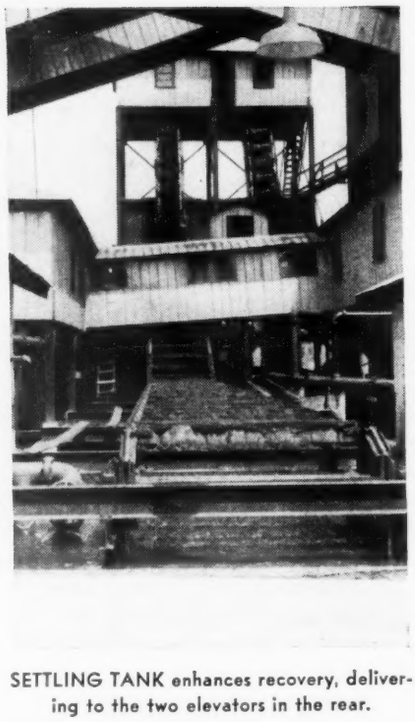
The two slope openings are 2,400 ft. apart at the surface, with the preparation plant at No. 2. As noted, a connection from No. 1 in the bottom of the basin has been completed with a cross haul of about 1,400 ft. It is expected that the cross haul will be equipped with a hoist, which will divert some of the No. 1 coal to a yard in the basin in No. 2 mine. Present locomotive equipment, all in the basin on the No. 1 side, consists of two cable-reel-and-trolley units, one a 7-ton Westinghouse and the other a 6-ton General Electric. These locomotives gather from hand loaders in certain sections of the flatter-lying coal.

A 150-hp. hoist presently serves No. 1 slope, which is laid with 40-lb. rail. The No. 2, or future haulage slope for the entire operation, is fitted with a 300-hp. hoist. This hoist brings the coal out in trips of six cars (3 tons each). The cars are composite J. R. Hoe & Sons units with wood bottoms, steel sides and ends and Sanford-Day "Float-

Jigs and Tables Prepare Steam and Coking Coal

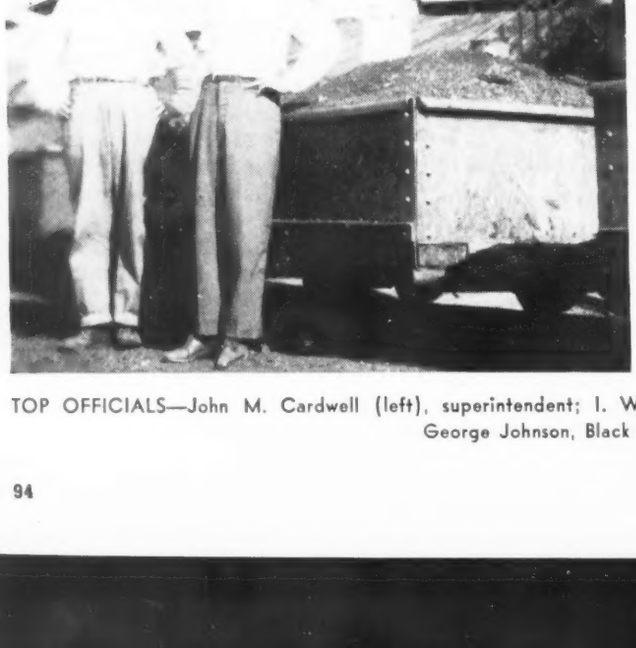


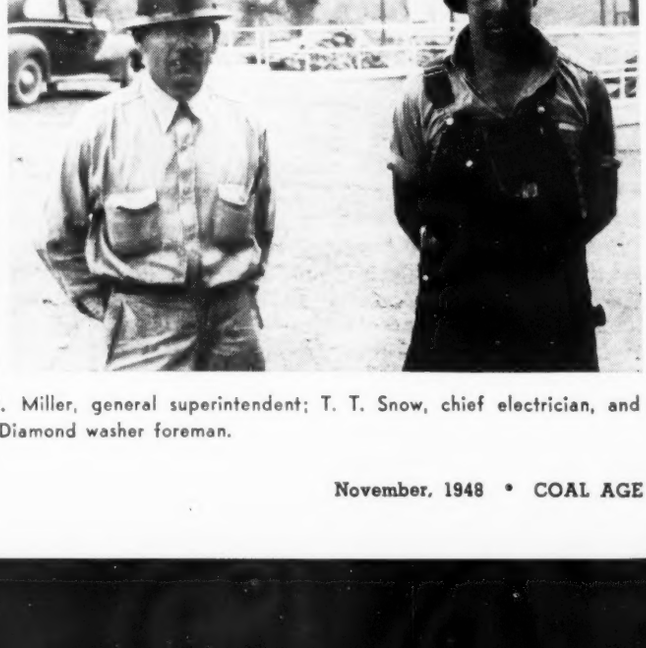
ONE OF THE THREE JIGS used for cleaning 3x⅝ steam coal. Each one is preceded by a 50-ton raw-coal storage bin and is fed via a plate feeder.



SETTLING TANK enhances recovery, delivering to the two elevators in the rear.

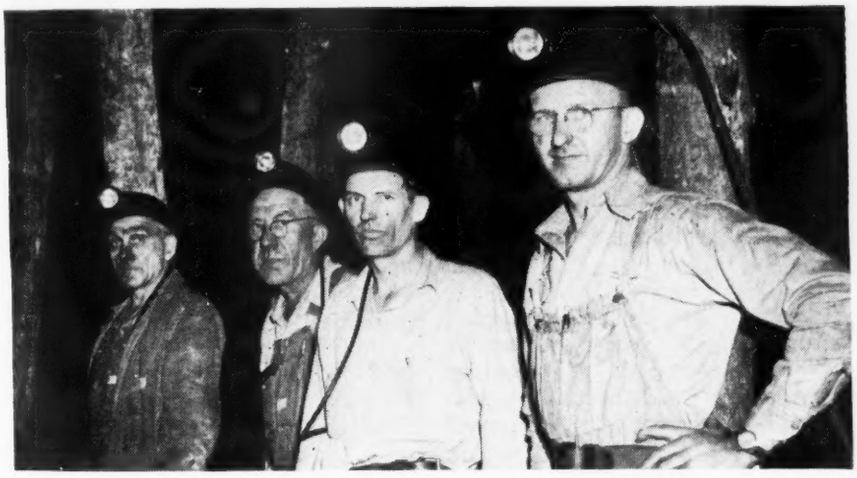
EIGHT COAL-WASHING TABLES prepare minus-⅝-in. coking coal at Black Diamond. Storage bin and revolving feeder (not shown) are above the table floor. Table discharge launders are lined with sewer tile.





TOP OFFICIALS—John M. Cardwell (left), superintendent; I. W. Miller, general superintendent; T. T. Snow, chief electrician, and George Johnson, Black Diamond washer foreman.

SEPARATE BINS for jig and table-plant refuse are in the foreground. Back of them (right and left) are the jig and table plants.



UNDERGROUND OFFICIALS—Chester Bennett (left), section foreman; W. B. Patterson, general mine foreman; David Pickett, safety director, and Robert J. Blair, ass't gen. supt.

er" wheels, and are dumped in a double two-car air-controlled rotary dump. No. 2 slope is laid with 60-lb. rail on old treated railroad ties. These creosoted ties are purchased at 60c. each and have given excellent service.

The slopes consist of three headings 10 to 12 ft. wide on 50- and 60-ft. centers. The center heading is the intake and the sides are the air courses, separated from the center by concrete block stoppings. An additional air course will be driven on the No. 2 side, where a new Jeffrey 8-8-72 Aerodyne fan went into service May 22, 1948. The new unit ventilates both sides of the property and replaced two small centrifugals, one for each opening. It is powered by a 200-hp., 2,300-volt synchronous motor already on hand. Output is approximately 90,000 c.f.m. at a 2.0-in. water gage. Driving the additional airway previously noted is expected to reduce the water gage to around 1½ in. when completed.

Room entries were turned right and left off the slopes as they were sunk at intervals providing room lengths of approximately 300 ft. Two headings (entry and air course) 10 ft. wide on 50-ft. centers make up the room entries. Rooms are turned approximately full width off the air course and are driven up the pitch 40 ft. wide on 80-ft. centers.

Chain-and-flight room, face and cross, or gathering, conveyors are the principal means of production at Black Diamond. Three-room set-ups are the rule, normally one per entry. A set-up consists of one room conveyor extending across the air course to the haulage heading; two additional room conveyors feeding to a cross or gathering conveyor in the air course, the cross conveyor in turn feeding to No. 1 room conveyor; and three face conveyors, one in each room. The room and face units are Jeffrey 61-AM and Jeffrey 61-HG units, respectively.

Auxiliary room-entry equipment includes a Sullivan CE-7 cutter with 6- or 7-ft. bar and a Chicago Pneumatic 572 hand-held drill in each place, plus a hoist on each entry. This hoist pulls six-car trips in from the side track, located at the slope turnout, spots the cars at No. 1 conveyor for loading and then drops the loaded trip back to the side track by gravity. The coal is very soft and, consequently, is easy to cut and drill.

Four Men in Face Crew

Crews normally consist of four men per face—a machineman, scraper and two loaders. A car trimmer and hoistman complete the crew of a multiple set-up. Production is about one cut, making 45 to 50 tons, per shift. Cleaning at the face is emphasized, which is a major reason why the management prefers hand loading onto conveyors. Impurities in the coal include bone, slate and rashy-slate partings, which are picked out to the maximum extent possible and thrown back between the timbers in the rooms.

When part of a fresh fall has been loaded, the machine is sumped in and starts to cut. When the loaders finish up, they start advancing timbering and getting ready for moving up the face conveyor. When cutting is completed, the machine runner and another man begin drilling. The machineman loads the shotholes while the other crew members pull the face conveyor up, using the cutting-machine chain jack, extend the room conveyor, set a row of posts behind the face conveyor and nail backboards onto these posts. In addition, a row of safety posts is set along the face in front of the face conveyor.

When everything is ready, the lower half of the seam is shot down against the backboards and the conveyors are started to run the piled-up coal out. Next, the top bench is shot, after which the crew begins loading. By using backboards, a substantial percentage of the coal

can be run out with no shoveling or handling whatever.

Places 40 ft. wide are shot with 12 or 13 holes. Five or six are drilled in the top, starting immediately over a 2-in. parting about 2 ft. down and angling up to the roof. Seven others are drilled straight in over two thin partings some 4 to 5 ft. down from the top. The bottom holes are fired together, followed by the top holes, also together. Bottom holes usually are loaded with five sticks in the two rib holes and four sticks in the center holes (Hercules 1¼x8 Collier C permissible); top holes, three sticks each. Behind the face conveyor the rooms are timbered with single posts on 4-ft. centers, including a row set along each rib. Line brattices in each place conduct the air to the face from the last crosscut.

D.c. power to operate face equipment is supplied by an m.g. set on the surface feeding through 500,000-cir. mil cables to the bottoms of the slopes. The returns consist of the entry and slope rails, which are bonded at each joint and cross-bonded. Main pumps on each side are operated on 2,300 volts, taken in at No. 1 through a lead-covered No. 4 three-conductor cable and, at No. 2, through an armored 2/0 cable.

Sump and Borehole Cut Pumping

The main dewatering unit on the No. 1 side is a 150-hp. 1,000-g.p.m. Gould centrifugal pump, discharging through a 335-ft. 8-in. steel-cased borehole. The pump is fed by a sump consisting of two rooms 30 ft. wide and 300 ft. long turned off the slope, with a capacity of approximately half a million gallons. Five small gathering pumps (6x6 Deming 4x5 Gardner-Denver and 5x5 Myers) deliver to the sump.

Construction of the sump and borehole eliminated 1,400 ft. of pumping up the slope through a 6-in. line, cut velocity head considerably and static head slightly. Before installation of the sump and borehole, it was necessary to pump every third shift and employ a pumper. Now pumping is done for about one shift once a week.

The main pump on the No. 2 side is a 500-g.p.m. Cameron centrifugal with 100-hp. motor, discharging up the slope to the surface through a 6-in. line. Gathering units on the No. 2 side comprise one 6x6 Deming and one 6x6 Myers.

In addition to the preparation plant, surface facilities at the mine include a freight house below the tipple, fireproof oil house, general building-material warehouse, office building, and electric shop with welding and cutting equipment, metal saw, radial drill, 18-in. lathe, shaper and 5-ton mine-made overhead crane with Shaw-Box hoist. A mine-made truck-mounted crane and winch is declared to be one of the handiest outfits on the property. It was built on a 1939 Chevvy and can lift and carry 4 tons and drag 10 tons. The winch with ⅝-in. wire rope is mounted behind the cab and is driven by a chain from an old mining-machine gear box, which in turn is operated by the regular power take-off on the truck.

Jigs and Tables Prepare Coal

Preparing a coking coal of 7-percent ash and a second steam grade averaging 8½- to 9-percent ash, the Black Diamond preparation plant employs both jigs and coal-washing tables. The plant was designed by George Barnard, Birmingham consulting engineer, and built by Black Diamond. It ships two grades from bins on a single track, employs vibrators for screening, and includes ample bin capacity ahead of all cleaning and preparation units, plus a settling tank for fine-coal recovery. Simplicity is a feature of the plant, along with low maintenance and a minimum of operating labor.

Coal, as previously noted, is dumped in two-car air-controlled rotary dumps. Below the dumps is a 50-ton raw-coal hopper, preceded by a flygate which permits diverting rock to the main 30-ton rock and pickings bin.

From the raw-coal hopper, a pan conveyor feeds the coal onto a 36-in. cross belt discharging to a single-deck vibrator jacketed with 3-in. round-hole plate. All coal over 3 in. goes to a short 48-in.-wide picking belt. Pickings are conveyed back to the 30-ton rock bin, equipped with an undercut gate for truck loading.

Hand-picked coal is discharged into a single-roll crusher which breaks it down to 3 in. or less. The crusher product joins the other minus 3 in. from the vibrator on a 30-in. belt for elevation to two vibrators, each equipped with a scalping deck (1-in. square mesh) and a final screening deck (⅝-in. square).

The 3x⅝ from the screens can go to any one of three 50-ton bins each feeding a modified Elmore jig via a plate feeder. As previously noted, these jigs produce a steam coal with an ash of 8½ to 9 percent. Jig refuse goes to a separate bin for truck disposal. Clean coal is discharged to a boot, from which an elevator picks it up, dewaters it and discharges it to a 50-ton car-loading hopper.

Minus ⅝-in. coal from the vibrators is elevated via a 24-in. belt to a 50-ton bin in the top of the separate table plant. Equipment includes eight Deister Concentrator Co. SuperDuty No. 7 Diagonal-Deck coal-washing tables and an eight-outlet Concenco revolving feed distributor. Coal is fed out of the 50-ton hopper into the distributor, which automatically splits it to the eight tables. Table-discharge launders are lined with sections of common sewer tile without cement between joints. The life is several times that of unprotected steel.

Refuse from the table plant is discharged to a separate 30-ton truck-disposal bin. The cleaned coal—less than 7½-percent ash—goes to the boot of a fine-coal dewatering elevator, which discharges it into a second 50-ton car-loading hopper. Both hoppers, built side by side, are over the same track and cars are loaded from either bin as conditions warrant.

Settling Tank Boosts Recovery

Fine coal and water from both the coarse- and fine-coal boots overflow into a concrete settling tank about 14 ft. wide, 10 ft. deep and 60 ft. long, with a capacity of approximately 70,000 gal. This tank, in addition to salvaging coal of the best coking quality, increased overall plant recovery some 10 percent. Fine coal removed from the settling tank by the dewatering drag is dumped to the fine-coal dewatering elevator and boot. Water from the tank is recirculated by a 4,000-g.p.m. 40-ft.-head Goyne pump. A 1,000-g.p.m. standby unit in a separate pump house is provided for use when necessary. The plant is operated in a closed circuit and the settling tank is dumped about once a month, largely to guard against the building up of fines around the pump suction strainer.

Except for the table plant, the Black Diamond operation features all-steel construction. It is operated by 28 motors totaling 350 connected horsepower. With a production of 600 tons per shift, the operating force, exclusive of the hoistman, dumper and chainer, totals six men, including the driver of the refuse truck. Facilities include a special elevator for cleaning out either of the elevator boots when necessary (see p. 114 of this issue).

Oil Treatment of Coal

Evaluation of Coal Dustiness — Oil Application — Oil-Treating Theory—Surface Area and Oil Consumption—Collateral Oil-Treating Benefits—Designing Dust-Suppressing Oils — Developing New Dedusting Materials

By G. W. WATERS
Shell Oil Co., Inc., Wood River, Ill.

AN INTEGRAL STEP in the preparation of coal for domestic use is treatment to free it from dust and leave it in such a condition that it will remain satisfactorily dust free for a practical period. Several materials have been and still are used for coal treating, including water, aqueous calcium chloride, calcium chloride-starch and calcium chloride-oil. However, petroleum-base oils are used in by far the greatest volumes and are preferred on the bases of ease of application, permanence of treatment and freedom from corrosive action.

The treatment of coal to suppress dust is less than 15 years old and, although the operation is well established, both the apparatus and technique, as well as the materials used, may still be considered in a development stage. However, the public has become so conscious of dust suppression that either untreated or inadequately treated coal frequently is rejected by the retailer.

As a unit operation, oil treating commonly is regarded as a losing proposition economically by the coal industry because the premiums received for treated coal fall short of meeting the material, labor and maintenance costs. Closer analysis of the problem discloses, however, some mitigating features:

1. The coal treater buys his oil on a volume basis and sells it by the pound. Dust-suppressing oils are designed to remain on the coal and, in general, the most effective oils are characterized by a high specific gravity. It is considered conservative to estimate that half the original weight of oil applied to the coal is sold at coal prices. If, say, coal sells at ¼ to ½c. per pound and 16 lb. of oil is applied per ton, this estimate would suggest a realization to the coal company of 2 to 4c. per ton for the treating oil. Such figures represent a sizable proportion of the treating cost. It might be added that the customer benefits because the B.t.u. content of oil is considerably higher than that of coal.

2. Coals frequently are stockpiled for prolonged periods and also are shipped considerable distances by rail or boat. During such periods, considerable losses result through blowing of dust and fines when the coal is not treated. Treating reduces or completely eliminates such losses.

3. Although there are no figures from which its magnitude may be estimated, a third factor is loss in weight through evaporation of inherent moisture in the coal. Effective oil treatment seals the pores of the coal and prevents this dehydration. Again, if coal value is assumed to be $5 to $10 per ton, a loss of 1 percent in weight through evaporation would aggregate between 5 and 10c. per ton.

It is logical to conclude, therefore, that a broader view of the situation discloses ample compensation for coal treatment since the domestic market absolutely requires a product free from dust. Overemphasis on the cost of coal treating may, in fact, lead to false economy since it imposes critical limitations both on the quality of materials and on the extent to which suppliers can conduct research in the further development of treating products.

Although the dust-producing tendencies of all types of coal are reduced by the application of oil, bituminous coals, which offer the major problem, respond most markedly to oil treatment. It is with this most "dust-critical" class of coals that this paper will deal. However, the general principles may be regarded as applicable to all coals, although to somewhat different degrees.

Abstract of a paper presented at a 1948 meeting of the Illinois Society of Coal-Preparation Engineers and Chemists.

Table I—Relative Rank of Four Bituminous Coals

	Percent Fixed Carbon, Dry Mineral-Matter-Free Basis	Calorific Value, Moist Mineral-Matter-Free Basis, B.t.u. per Lb.	Group
Illinois No. 6	58.3	13,540	High-volatile "B" bituminous
Pittsburgh	62.0	15,060	High-volatile "A" bituminous
Island Creek (W. Va.)	64.9	15,120	High-volatile "A" bituminous
Pocahontas No. 3 (W. Va.)	81.8	15,710	Low-volatile bituminous

Evaluation of Coal Dustiness

Measurement of the dustiness of a coal is accomplished by A.S.T.M. Standard D547-41.[3] A 50-lb. sample, previously air dried, is dropped 4 ft. in a dust-tight box. The resultant dust is collected on a metal slide inserted 2 ft. above the bottom of the box 5 seconds after the drop. This slide is withdrawn after 2 minutes and the dust is collected, removed and weighed. This dust is termed "coarse dust."

A second slide is permitted to remain in position an additional 8 minutes. The dust collected on it is termed "float dust." From the quantity of dust collected, a "dust index" is calculated. The index is defined

as grams of dust per ton of coal.

Dustiness tests are carried out in duplicate and the results are averaged. Precision is such that the result of an individual test seldom varies from the average of the two by more than 10 percent.

This test method is used to evaluate the effectiveness of a dust-suppressing treatment by aging the coal by exposure to atmospheric conditions and relating dust indexes to time of aging. There is no universally accepted criterion for satisfactory treatment in terms of the dust index. The literature[1] states that float dust should be eliminated completely and that the coarse-dust indexes after treatment and storage for one week should be equal to or less than the following:

Lump, egg and stoker	70
1½- or 2-in. slacks	90
½- or ¼-in. slacks	130

In the field, a coarse-dust index of 100 after storage of a week to 10 days is the generally accepted criterion for satisfactory treatment.

The A.S.T.M. procedure seldom is used at the mines. First, the equipment is not generally available. Second, the times involved for aging are prohibitive at the mines, where an evaluation of treating effectiveness usually is needed in a short period. The conventional methods employed at the mines are visual inspection, touch and tossing a shovelful in the air. While such methods leave much to be desired, the experience of the men employing them permits at least distinguishing between satisfactory and unsatisfactory treatment. By far the most dependable test is acceptance of the coal without complaint by the retailer and finally by the consumer.

There is a distinct need for a quantitative method of evaluating the effectiveness of dust-suppressing treatment that does not involve more than a week's time or equipment and technique out of proportion to the facilities at the mines.

Oil Application

Oil usually is applied for suppressing dust[1,2,3] by spraying the coal as it moves along a conveyor or drops from the end of a boom into a car or bin. The objective is a thin film of oil over the entire surface area of the coal. This cannot always be completely achieved at the spraying point and, for practical reasons, therefore must depend at times on mixing of the coal after spraying. Since the heavier oils have been found the most effective in suppressing dust, it normally is necessary to heat the oil to facilitate handling and pumping to effect distribution and keep oil consumption within economic limits.

With but minor variations, the great bulk of coal-treating oil is applied with equipment based on the "hot-vapor principle." A typical system[3] consists of:

1. One or more storage tanks equipped with steam coils.

2. An electrically or steam-driven centrifugal pump for transferring oil from the tank to a heating unit.

3. A heating unit—sometimes electrical but usually a steam-oil heat exchanger.

4. Insulated lines to the preparation plant. These lines may be heated electrically, steam traced or heated by a companion line carrying hot oil. Occasionally, the lines are insulated only and reheat is supplied at the tipple.

5. A manifold at each application site, from which smaller lines are carried to the treating nozzles.

6. Treating nozzles. The number at one treating site may vary from one to 12, depending upon the size of the coal, the velocity past the nozzles and the mechanical design of the system.

7. A return line to the pump or storage tank to permit circulation of the oil.

8. Occasionally, but not generally, oil meters in the lines between the main header and the nozzles.

9. A screen strainer in the main oil line.

Variations from such a general layout may extend from hand sprays for treating large lump in the cars to dual circulating systems, one handling treating oil and the other circulating a heating medium. There is, of course, wide variation in such factors as heating capacity and maximum pressure available. Such limitations determine the characteristics of the treating material any given system can handle and contribute to the necessity for several viscosity grades in a complete line of coal-dedusting compounds.

One method of application involves use of a water emulsion of the dedusting oil and therefore deviates markedly from the hot-vapor principle. Water to thin the treating material is simply a substitute for heat. Although in general this is a satisfactory although rarely used method, there are two objections at the present time: no inexpensive emulsifying agent has been developed and trouble has been experienced with a brownish discoloration of the coal attributed to the emulsion.

Oil-Treating Theory

Very little, if any, of the laboratory work on oil treatment of coal can be classed as basic research. There are, therefore, many theories and ideas about how an oil suppresses dust and about what constitutes a good dust-suppressing oil. The simplest and most logical[1,3] holds that the oil creates an adhesive film on the coal surface to which the fines and dust adhere. An additional effect is agglomerating the fine particles into larger masses too heavy to be borne by air. From such a standpoint, water is an effective treating material but, because of its relatively rapid evaporation, the effect does not last. Water has been and still is used extensively by retailers to free untreated coal of dust immediately before delivery. A proper petroleum oil is a more effective treating material than water, however, because of its tendency to remain on the coal and control the dust for a longer period.

On the basis of this theory, certain characteristics become the requisites of a good dust-suppressing oil:

1. The oil must be non-volatile to prevent rapid evaporation.

2. The oil must be tacky to provide the required adhesive effect.

Coals frequently are water-washed at the mine to eliminate impurities and improve combustion characteristics. Such coals are treated wet. Hence, an additional characteristic of a treating oil is:

3. Ability to penetrate a water film on the coal and preferentially wet the surface.

The quality of present-day treating oils is somewhat uncertain from

[1] "Quiz Book on the Oil Treatment of Coal," Bituminous Coal Research, Inc., Standard Oil Co. of N. J., Sun Oil Co. and the Viking Mfg. Co.; June, 1939.

[2] "The Treatment of Coal With Oil and Other Products," J. M. Pitcher and Ralph A. Sherman; Cont. No. 113, A.I.M.E., June, 1939.

[3] "Treatment of Coal Surfaces," J. M. Pitcher and Ralph A. Sherman, *Coal Preparation*, A.I.M.E.; 1943, pp. 653-685.

this standpoint and it is in this feature that there is an opportunity for improvement in the future.

There is, even over relatively small coal-producing areas, considerable variation in the physical properties and composition of coals. The nature of a coal, and particularly the surface characteristics, markedly influence the response of the coal to dust-suppressing treatment. Important factors include porosity, moisture content and friability. These factors are among those that determine the rank or grade of a coal and are related mineralogically to such composition factors as total volatile content, fixed carbon, etc.

While low-viscosity distillates (ca 100-200 SSU at 100 deg. F.) effectively suppress the dust of nonporous coals, they are ineffective with porous coals since they are absorbed rather than retained on the surface. More-viscous oils are needed for such coals and, further, these oils must be selected and blended carefully to impart to the product ability to control immediately the dust-producing tendencies of these more-difficult coals and also provide a lasting effect that will insure freedom from dust until the coal reaches the firebox. A fourth oil requisite, which is dependent upon the porosity of the coal, is:

4. Proper viscosity characteristics.

These include composition features that enable the oil to create and maintain an adhesive film on the coal surface. Oil viscosity, of course, is subject to the practical limitations of the equipment used and the available heat and pressure.

The friability of a coal, regarded as being related both to porosity and inherent moisture, imposes a requisite which might appear directly opposed to that discussed in the preceding paragraph. If the coal is dry and porous and subject to breakage, it may be expected to produce dust during handling after oil treatment at the mine. When this happens, some penetration of the oil into the pores is desirable to assure protection of the new surfaces as they are formed.

Perhaps a greater benefit that a treating oil can contribute to a friable coal is sealing the pores to prevent loss of inherent moisture and attendant increase in tendency to disintegrate. At least one proponent of this theory believes in such a result so strongly that he regards rate of inherent-moisture loss as a measure of the effectiveness of oil treatment. It is in connection with this pore-sealing quality that petrolatum-base blends have been regarded as particularly advantageous for treating coal that will be stored several months.

Coals are rated as to rank or quality on the basis of their physical and chemical properties, and it has been found that the proper type of treating material is determined by the rank of the coal. Table I[2] shows some of the factors determining coal rank. Limits are, of course, much wider than these data, which are pertinent only to bituminous coals.

The authors who studied these coals found that as the rank increased (from top to bottom in the table) the less important the viscosity of the oil became.

While no specific rules are available, some generalizations have been made on the relation between rank of coal and type of oil:[1]

Semi-bituminous or low- and medium-volatile coals—High- and low-viscosity oils generally equally effective.

High-rank high-volatile coals—Oils of 200 SSU at 100 deg. F. usually more effective than 100-viscosity oils, but the increase in effectiveness of oils with a viscosity greater than 200 is not great.

Low-rank high-volatile bituminous coals—High-viscosity oils or blends of oil with petrolatum or asphalt are, in general, more effective than low-viscosity oils.

Inasmuch as dust-suppressing oils are applied at elevated temperatures and in the form of dispersed sprays or fogs, there is a fire hazard associated with their use. This factor enhances the importance of:

5. Flash and fire points of the oil.

Since viscous materials are most effective, loading and unloading of the oil in delivery to the mine, and line and nozzle plugging in use, require attention to:

6. Pour point of the oil.

Although left to the last, a prime requisite of a coal-dedusting oil is:

7. Freedom from odor.

While not based on technical considerations, customer acceptance precludes use of a material that creates an odor in the home. This, in fact, is the first question raised in considering the suitability of any new dedusting product.

Surface Area and Consumption

Oil consumption is of major concern because it determines, more than any other factor, the economy of the treatment. Perhaps the most important yet seemingly disregarded factor controlling consumption for a given degree of treatment is the size distribution of the coal. As an example, oil dosage is almost universally calculated on the basis of volume per weight of coal—in other words, gallons per ton—rather than on volume per unit of surface area.

Inclusion of fines increases enormously the surface area of the coal and the proportionate consumption of oil to achieve satisfactory treatment. An example from practical experience will assist in indicating the importance of this factor. First, however, it is in order to discuss briefly the method used in estimating the surface area of coal. Screen-analysis data, obtained on the coal at more-frequent size intervals and over a broader range of sizes than in conventional screen analysis, are the basis. The following calculations are made:

1. The arithmetic mean, designated as a, is calculated for the two mesh sizes passing and retaining each fraction of the coal.

2. The arithmetic mean, a, is assumed to be either the diameter of a sphere or the side of a cube of coal. That is, all the coal particles of a given size fraction are assumed to be either spheres with a diameter a or cubes with a side a. The relationships involved are such that the assumptions of cubes or spheres of the designated dimensions yield the same calculated surface area.

3. Upon the basis of Par. 2, the volume of the average-sized particle is calculated for each size fraction employed in the screen analysis. For the i fraction, for example, volume of the average particle equals $1/6\pi a_i^3$ (sphere), or a_i^3 (cube).

4. The weight of the average coal particle then is the product of the volume and the specific gravity, or $1/6\pi a_i^3 d$ (sphere) or $a_i^3 d$ (cube), where d is the specific gravity.

5. The number of average-sized coal particles per unit weight

Table II—Size Analyses of Various Coals—Gravity 1.5 Grams

Fraction Number	Fraction Size Range	*a*, Inches	Specific Area, Sq. Ft. per Lb.	COAL I				
				Percent Weight, 1st Analysis	Area, Sq. Ft. per Lb.	Percent Weight, Fines Made	Percent Weight, Corrected Analysis	Corrected Area, Sp. Ft. per Lb.
1	+ ½-in. sq.	0.5	1.54	59.87	0 922	....		
2	½x¼	0.375	2.05	38.00	0.779	....		
3	¼x4 M	0.218	3.53	0.96	0.034	....		
4	4x6 M	0.160	4.81	0.20	0.010	....		
5	6x20 M	0.083	9.28	0.17	0.016	....	99.97	1.960
6	20x40 M	0.0248	31.0	0.12	0.037	....		
6a	40x50 M	0.014	54.6	....	....	....		
6b	50x80 M	0.0094	81.9	....	....	....		
7	40x80 M	0.0118	85.2	0.18	0.117	....		
8	80x100 M	0.0064	120	0.08	0.096	0.04	0.04	0.048
8a	—100 M	0.0030	257	....	....	....	....	....
9	100x200 M	0.0044	175	0.11	0.192	0.07	0.04	0.070
10	—200 M	0.0014	550	0.31	1.705	0.16	0.15	0.825
Totals	.....	.....	.....	100.00	3.9	....	100.00	2.9

Table III—Relation of Size and Surface Area of Island Creek Seam Coal to Quantity of 200-Second-Viscosity Oil "B" Required, One Week After Treatment

Size, Inches—Mesh	Specific Surface Area, Sq. Ft. per Lb.	Quarts Oil "B" Required per Ton to Obtain Coarse-Dust Index of 80
0 x ⅜	43.5	8.2
0 x 1¼	20.2	6.4
0 x 1½	13.8	2.7
20M x 1¼	6.5	1.8
⅜ x 1½	1.85	0.3

(pound of coal) is given by the reciprocal of the weight of the average particle. Thus, the number of average coal particles per pound equals:

$$\frac{6}{\pi a_i^3 d} \text{ (sphere), or } \frac{1}{a_i^3 d} \text{ (cube).}$$

6. Upon the basis of Par. 2, the surface area of the average-sized particle of coal in a given fraction equals πa_i^2 (sphere), or $6a_i^2$ (cube).

7. The specific surface area (square feet per pound) is calculated for a given fraction as the product of the number of average-sized particles and the surface area of the average-sized particle. For the *i* fraction, for example, the specific surface area is:

$$\frac{6}{a_i d} \text{ (sphere), or } \frac{6}{a_i d} \text{ (cube).}$$

8. The product of the specific surface area of a given fraction and the weight percentage found for that fraction fixes the contribution of that fraction to the total specific area of the coal. Thus, where u_i is the percent weight of coal found in the *i* fraction by screen analysis, the specific area for the *i* fraction equals:

$$\frac{6}{a_i d} \cdot \frac{u_i}{100} \text{ (spheres or cubes).}$$

9. Finally, the total specific area of the coal is calculated by summation of the individual contributions of the fractions, or the total specific area of all fractions equals:

$$\sum \frac{6\,u_i}{100\,a_i d} \text{ (spheres or cubes).}$$

Ten size fractions have been used in the application of this method:

1. On ½-in. square.
2. On ¼-in. square, through ½-in.
3. On 4 mesh, through ¼-in.
4. On 6 mesh, through 4 mesh.
5. On 20 mesh, through 6 mesh.
6. On 40 mesh, through 20 mesh.
7. On 80 mesh, through 40 mesh.
8. On 100 mesh, through 80 mesh.
9. On 200 mesh, through 100.
10. Through 200 mesh.

Screen sizes are U. S. Standard. Reproducibility of the method is determined by the reproducibility of the screen analysis, which is generally satisfactory. However, since this method is applied in evaluating the importance of fines, it was believed essential to attempt to learn to what extent fines were produced during the screen analysis. This was studied by selecting two coals of equal specific gravity (1.5 grams per cubic centimeter or 93.6 lb. per cubic foot) but of widely differing size distribution.

Screen analyses were performed on these coals, involving division into the 10 fractions previously listed. The first seven fractions were returned to the shaker and again subjected to the same treatment as in the original analysis.

per Cubic Centimeter or 93.6 Lb. per Cubic Foot

	COAL II					COAL III		
	Percent Weight, 1st Analysis	Area, Sq. Ft. per Lb.	Percent Weight, Fines Made	Percent Weight, Corrected Analysis	Corrected Area, Sq. Ft. per Lb.	Percent Weight, Correct Analysis	Correct Area, Sq. Ft. per Lb.	Cumulative Area, Sq. Ft. per Lb.
1	1.48	0.023	....			1.5	0.02	....
2	30.86	0.633	....			36.5	0.75	0.77
3	25.20	0.890	....			29.0	1.02	1.79
4	21.05	1.013	....			19.8	0.95	2.74
5	15.60	1.448	....	96.61	4.987	11.2	1.04	3.78
6	1.20	0.373	....			0.3	0.09	3.87
6a	....	....	....			0.1	0.05	3.93
6b	....	....	....			0.1	0.08	4.01
7	0.83	0.542	....			0.1	0.12	4.13
8	0.40	0.481	0.08	0.32	0.385	....	....	....
8a	....	....	....	....	....	1.4	3.59	7.72
9	0.62	1.085	0.06	0.56	0.980	....	....	....
10	2.76	15.180	0.25	2.51	13.805	....	....	....
Totals	100.00	21.7	....	100.00	20.2	100.00	7.7	....

After this second shaking, the quantity of fines produced was obtained by weighing Fractions 8, 9 and 10. This was assumed to be the quantity of fines produced during the analysis and was used as the basis for correcting the original analysis.

The percentage of fines produced was distributed evenly over the first seven fractions and Fractions 8, 9 and 10 were decreased by appropriate amounts.

The data are shown in Table II as Coals I and II. Coal I, essentially free of fines, produced enough small particles during analysis to increase its specific area from 2.9 to 3.9 sq.ft. per pound, or 35 percent. On the other hand, Coal II, which initially contained a relatively high proportion of fines, produced only enough additional small particles to increase its specific area from 20.2 to 21.7 sq.ft. per pound, or about 7 percent. It is indicated that this source of error is of greater importance with coals initially fines free. However, since little additional work is involved, it is recommended that this correction be applied each time the method is used.

Comparison of the data for Coals II and III of Table II reveals an interesting point. These samples were obtained from the same mine at the same time. However, the analysis reported under Coal III was obtained immediately, whereas that reported under Coal II was three months later. During the interval, the coal had been stored in the laboratory open to the atmosphere.

The greatly increased surface area, attributable to the formation of smaller particles at the expense of the larger, may be explained, it is believed, by the loss of inherent moisture during storage. This would be expected to make the coal more friable and enhance the tendency toward production of dust. This is, of course, in agreement with experience throughout the coal industry, but serves to emphasize the performance required of dust-suppressing materials.

An important qualification of this method of estimating surface area of coal—over and above the arbitrary assumptions—is failure to take into consideration the porosity of the coal. Neglect of this factor definitely characterizes the method as a first approximation. At present, however, there is no accepted method whereby the additional area representing the pores can be estimated.

To get back to the example mentioned earlier as illustrating the importance of the effect of surface area on the consumption of spray oil, the recent experience of one mine can be cited. Coal III of Table II is the coal in question. Dosage of the order of 4 to 4½ gal. per ton is required to control the dust of this coal, whereas normal consumption for stoker coal is about half these quantities.

In the production of this coal, a small percentage of fines was deliberately included. It will be seen in the extreme right-hand column of Table II that whereas about 98 percent weight of the coal (minus 20 mesh) has a surface area of 3.9 sq.ft. per pound, inclusion of the finest 2 percent weight about doubled the area. This readily accounts for the twice-normal oil requirement and emphasizes the role of surface area as a determining factor in oil consumption.

The importance of surface area from the standpoint of oil use has been discussed much earlier. The data in Table III, taken from a study made in 1939,[2] demonstrate the relationship for a given coal. However, the previously mentioned tendency to disregard this factor justifies, it is believed, its re-emphasis here.

Added Oil-Treating Benefits

Claims have been made from time to time that the application of oil to coal accomplishes effects other than the suppression of dust.[2,3] These include:

1. Improved ignition and burning characteristics.
2. Decreased freezing.
3. Water-shedding effect.
4. Reduced windage loss of fines in transit and during outdoor storage.
5. Decreased segregation and arching.
6. Preservation of the metal parts with which the coal comes in contact.
7. Reduced tendency toward

spontaneous heating in storage.

8. Reduced air slacking and disintegration.

9. Improved carbonization practice.

Some of these claims have substantiating data and some are questionable. In general, they represent controversial issues and it is agreed that any effects, if at all, are minor, with the possible exception of the second. It is generally recognized that oil spraying of coal either completely eliminates or reduces the extent to which coals must be treated to prevent freezing.

Designing Coal-Treating Oils

As set forth earlier, a good coal-treating oil should have seven major characteristics:

1. Low volatility.
2. Permanent tackiness.
3. Adequate wetting ability or tendency to spread on the coal.
4. Proper viscosity, or body.
5. High flash and fire points.
6. Low pour point.
7. Freedom from objectionable odor.

These might be divided into two groups, the first four representing performance characteristics that must be realized within the limitations imposed by the last three, which are physical properties.

The first petroleum products for treating coal were either straight distillates or residuals and almost always were "waste" materials that otherwise would be burned at the refinery. The author's company, however, through laboratory study involving oil application and determination of dust indexes, found, some 10 years ago, that nature does not include in crude oil a perfect dust-suppressing material.

Nature does, however, include in crude oil components from which effective materials can be formulated. As is generally true of petroleum products, the best dedusting materials must be produced by blending several components to achieve the desired characteristics. Often, optimum proportions of these components must be maintained to achieve maximum quality.

First, a base material is compounded. Heavy materials that will provide low volatility, body, pore-sealing and permanent tackiness are selected. The principle is that the base material is the material that will remain on the coal and keep it dust free for prolonged periods. It must agglomerate the dust and also must prevent the generation of additional dust through to the time the coal is put into the furnace. Two or more separate materials may have to be blended to achieve this result.

The dedusting-oil base may be a solid or a semi-solid much too heavy to apply directly. It must be thinned by a diluent. The diluent not only makes the base sufficiently fluid for practical handling but disperses it so that the base is distributed uniformly over the surface of the coal.

Essential properties of the diluent include freedom from odor, high flash and fire points and ability to maintain the whole product fluid at reasonable temperatures. The combined product must possess ability to wet the coal and spread evenly and rapidly before congealing or hardening occurs. This ability may be incorporated either in the base or in the diluent. The proper degree of penetration into the pores of the coal must be realized. This quality of penetration represents a balance between effective protection and economical consumption.

It is generally held that the diluent evaporates completely and hence does not contribute to the permanence of the treatment. This is not necessarily the case, since it is possible, through control of the composition of the diluent, to provide an enhancement of the action of the base and thus design a diluent to be more than just a carrier. However, the evaporation or disappearance of the diluent is essential in some degree to prevent the shedding of oil in the coal bin with the attendant nuisance of tracking oil through the house.

It may be concluded that the treating-oil base is the main functional portion of the product which is enhanced and rendered applicable by the diluent, and that complete formulation requires, for highest-quality products, a knowledge both of the requirements of the job and the properties of the constituents of the product.

Developing New Dedusting Oils —Maintaining Product Quality

Dedusting oils commonly are sold on the basis of specification properties, such as viscosity, flash, fire and pour points, and gravity. In some instances they are formulated on such a basis. However, this should be recognized as inadequate for insuring the quality of such materials.

Performance tests, including spraying coal under conditions closely simulating regular practice and determination of dust indexes in terms of aging, are the only proved methods of guaranteeing quality. Such methods must be employed in the development of new materials and also in all re-formulations of established products, except those involving slight changes which it is known will have only minor effect.

Such studies are of value to the producer of treating materials over and above evaluation of products in ascertaining the effect of variables in the coal-treating operation, such as size of coal, speed of delivery, design of apparatus and coal conditions (wet or dry, warm or cold, etc.).

Application of actual performance tests has served and continues to serve as the basis of development and control of quality of dedusting compounds produced by the author's company. Through such studies it has been found that:

1. Assuming a constant surface to be covered and within any one series of blends of the same basic type, the higher the viscosity the more effective is the blend as a dedusting compound, and consequently the smaller the quantity required per ton.

2. The higher degree of emulsion effectiveness is a result of (a) the extremely high viscosity of the oil portion of the emulsions and (b) the presence of ample water to assure uniform distribution of the oil over the coal surface.

3. Selection of the proper type and grade of dedusting compound for any specific installation is an economic question depending upon various factors, such as type of coal, degree of dedusting required, equipment available for application and other similar considerations.

The development of dust-suppressing oils has progressed out of the realm of pure empiricism and is becoming more strongly established on scientific principles. Considerable latitude remains for the further development of these products and continued research is indicated as the logical approach. As such research progresses, it may be predicted that new and more effective treating materials will be brought out and that new equipment and application techniques will be developed. The end result will be not only better treated coal but also advances in the economics of coal treatment.

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The Foremen's Forum

How Good Foremanship Makes Your Workers Turn in Better Jobs

IF YOU'RE LIKE MOST FOREMEN, whether in the coal industry or elsewhere, your biggest problem is how to get the best out of your men. Of course, there are some factors in your job that you can depend on most of the time—your power supply, to mention only one, which usually is pretty steady and pretty constant no matter what you do. Also, you can count on good performance from your machines—or you should be able to if those men in the maintenance shop, who are outside your control, do their job. Likewise, the man-trip usually is dependable, getting your men to the face at the right time and picking them up when the day is over. In short, you can count on pretty steady performance from most of the factors over which you have no control.

But the one big factor that you can't count on from day to day, the control of which is in your hands for the most part, is the human element—the men whom you direct. The thing that really spells the difference between an average production record and a top-notch performance is the way your men work—how they operate their machines, how they handle their supplies and materials, how they set their timbers and lay their track, how they gear their movements with the actions of other crew members to make a smooth-working team.

Controlling and guiding this variable human factor is your major job as a foreman. How well you do it determines the standing of your crew or section and, in the long run, your movement up or down the ladder of success.

The secret of getting the best from your men lies in creating a climate that induces them to work their best. That's where the load falls on you. How can you, as a foreman, create a climate that invites efficiency? Here are eight suggestions that may be helpful, most of them involving the streamlining of your own job as foreman:

1. Plan your work ahead. Know what you are going to do every week before the week starts and every day before you go underground. Arrange with the supply house for materials and tools before they are needed. Keep posted on the schedule for maintenance and overhaul of machines and arrange for substitute equipment ahead of time. Don't get caught short because you haven't studied the mine map to find out what troubles you might run into. As far as you can, imagine every emergency that might happen and plan your moves so as to be ready for anything.

2. Be sure you yourself understand clearly the things that have to be done. If it's building an underground dam, be sure you've got the construction details firmly in mind and then set up the job in your mind so that one step logically follows another. If it's driving through rock, study the engineer's drawings and talk to the superintendent about what he expects of your crew. If it's putting a new machine to work, be sure you've got the hang of it yourself before you turn your men loose with it. If you don't understand what has to be done and haven't thought it through in advance, you'll have a hard time telling your men what to do and a harder time persuading them that you know what you're talking about.

3. Lay out each job for a minimum of lost motion. This applies to moving the various machines around in the cycle of cutting, drilling, loading and shooting so that the least possible time is spent in tramming or idling. It applies also to timbering, tracklaying, moving locomotives and switching cars, cleaning up, etc.

It's not always easy to persuade workers to take on new ways of doing their job. Still, there are lots of miners who, by long habit or through ignorance of a better way, keep on making unnecessary arm movements or taking unnecessary steps to get a job done. Maybe they just haven't given the matter any thought. That's your job—to give the matter thought. Be quick to spot waste motions and suggest ways for your men to do their job with less effort and equal efficiency. If you approach them right, the chances are they'll go along with your suggestions. If you can, show them some time-and-motion study pictures or films. Maybe the pictures won't be about coal but, even so, they may start your men thinking about how they do their own jobs—and you might get an idea yourself.

4. Keep your production records up to the minute. Don't wait for your men to ask you where they stand. Be able to show them what they have done at the end of every day's work. In this way, you can keep them competing with their own records as well as with other crews in the mine. But you can't build up much competitive spirit by guessing at what they have done—you've got to know the facts. So stay on top of your job.

5. Keep tabs on your men so well that you can spot a weakness and correct it before it grows into a major problem. This doesn't mean that you've got to be on your men's necks every minute. If it meant that, you'd stand to lose more than you'd gain, because most men resent that kind of treatment. It does mean, however, that if you permit a little horseplay you may have a first-class battle on your hands before you know it; if you let a little absenteeism slide by, you'll turn up some day without enough men to make it worthwhile to go inside; if you permit a little slacking off, you'll have a real problem of "soldiering on the job" before long.

Most important of all, if you tolerate a little carelessness, you're building up to big trouble. The man who is just a little bit unsafe is like the girl who is just a little bit pregnant. So keep your men safe, alert and busy. The moral is that if you stay on your own toes, you'll have less trouble keeping your men on theirs.

6. Show your appreciation of good work by complimenting your men when they deserve a compliment and by recommending them for better jobs when they turn in a good record. Never let a well-done job pass without praising the men who did it. By the same token, stay close behind the man who slacks off. Don't try to drive him and don't belittle him but do show him that better work brings rewards and helps him, his buddies and his company get along.

7. Encourage your men to tell you about their ideas for boosting effi-

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ciency. When a man's ideas are good, give him full credit by complimenting him and then tell the superintendent where the idea came from. Be sure you keep your mind open to suggestions. It's pretty easy to think that because you're the foreman, nobody, least of all a man who takes orders from you, can tell you how to improve your work. That attitude has been a neck-breaker for lots of foremen.

Think through your men's suggestions from all points of view—production, safety, teamwork, ease of operation, etc. If the suggestions are good, put them to work. If you have some doubts, talk them over with your superior or even try out the suggestion yourself to see how it works. Finally, if the suggestion isn't workable, show the man who offered it why it won't work, thank him for his interest and invite him to try again.

8. Finally, show your men that the way to promotion is open by doing your own work as if you expected a promotion tomorrow. There's no teacher like a good example.

•

When a Foreman Should Write It Down

Are you a pencil-pusher or a foreman? A stenographer or a boss?

It's pretty easy to spend so much of your time taking notes and writing things down that you slack off on your main job—getting the maximum tonnage of coal at the lowest possible cost with the greatest safety for your men. The truth is that writing things down is just an aid—not the big job itself. That's why it's important to know what to write down and what not to write down.

Below is a list of the most important occasions when a foreman should take notes. If he limits himself to these times, his note-taking will be a useful tool, promoting rather than interfering with his efficiency.

1. When top management announces a change in policy. Policy changes often affect, directly or indirectly, everybody who works for the company, including the foreman. A company's policy sets the tone of its relations with its workers, its customers and its community, sets up the relationships among its many departments and provides a chain of command for getting things done. It is, in short, the expression of a company's business philosophy and it sets the pace and the standard for everything that's done.

That's why you, as a foreman and therefore a key man in your company's operations, must understand your company's policy completely and must enforce a policy change wherever it makes a difference in your relations with your superiors, your workers, your fellow foremen and your community. Therefore, when a policy change comes along, get it straight and clear. Write it down. Study it and make notes on how it affects you and your men. Then keep your notes as a record and as a guide.

2. When a change from normal practice or methods is ordered. It may be a new way of making daily or weekly reports, a new timbering plan, a new face cycle or a new fire-and-rescue procedure. Whatever it is, if it's the least bit complex, write it down. Then you'll be sure you know the details yourself and thus you'll be able to pass the word along to your men clearly and accurately.

3. When you have something important to say to your men. The operation of new machines, a change in pay procedure, a new schedule for supplies and materials or an effort to show how higher productivity helps everybody can be much more effectively presented to your men if you make notes in advance. Notes will help you organize your thoughts and arrange your job descriptions systematically and logically. They also will insure you against omitting anything you ought to say.

4. When you're listening to a complaint by one of your men. A man's complaint, though it may seem trifling to you, is pretty important to him. Moreover, dealing with men is a lot more complex and delicate than dealing with machines. You've got to get the facts straight. Any distortion or omission of the facts in a worker's complaint can be very harmful to him, to you and to the company. That's why it's dangerous to depend on your memory to keep the facts straight. Write them down as the man tells them to you.

There are other advantages in taking notes on complaints. In the first place, if your man sees that you're writing it down, his first thought is that you intend to do something about it. That's good. A worker has a right to expect that his complaint will be handled swiftly and effectively. If you take notes on what he says, you're giving him good reason to believe that you're taking his complaint seriously and that you want to get the facts straight as the first step in doing something about it.

In the second place, taking notes on a complaint will slow down an angry man and cool his temper off. Men naturally are more careful about written words than spoken words. The sight of your notepad and pencil will make an angry man think twice before he plunges deeper into his complaint. The chances are that he'll stick closer to the facts and, indeed, may even withdraw his complaint, realizing that it is hasty and ill-tempered.

So, whether it's a complaint about pay, overtime, distribution of work, working conditions or the maintenance of machinery, write it down. Then, when you've got it all noted, read your notes back to your worker as you have them, give him a chance to add or take out anything, assure him that you'll do all you can to see that he's treated right and then start the complaint up the line.

5. When you're dealing with important numbers. The details about money, specifications, percentages and dimensions are hard for most people to remember but they are about the only way of measuring a man's worth, the quality of a product, progress in production and safety and sizes and amounts of tools and supplies needed. Many figures are important tools for a foreman in settling arguments over pay and in seeing that his men get a square deal. Specification figures are necessary for a preparation-plant foreman in seeing that the company's customers get the kind of coal they ordered. Percentage figures show a foreman where he and his crew stand in safety and productivity when compared with other crews and thus help the foreman build up teamwork and a competitive spirit. Finally, size and quantity figures guarantee a minimum of lost motion and a minimum of wasted materials and supplies by detailing such things as the right length for pit posts and crossbars, size and footage of cable and tolerances for shop-made repair and replacements parts.

Figures, therefore, are indispensable. But they've got to be right to do any good. That's why it's important not to trust figures to your memory. Write them down.

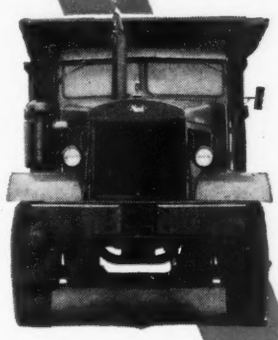
The five occasions listed above are "musts" for writing things down. There may be a few other times when your pad and pencil ought to be busy but, generally speaking, a foreman should think twice before taking time to write down anything that doesn't fall into these five classifications. As pointed out earlier, notes are only an aid and should be limited to situations in which they are helpful. A foreman ought to be a foreman, not a stenographer.

Ten Commandments Of a Safe Worker

1. **Keep in top physical condition.**
2. **Handle all tools and material with care.**
3. **Use safeguards provided for specific jobs.**
4. **Report all unsafe conditions to the foreman.**
5. **Report all injuries immediately.**
6. **Always keep your mind on your job.**
7. **Always be cooperative and promote good teamwork.**
8. **If you don't know, ask the foreman how to do the job safely.**
9. **Be a good housekeeper; keep your place clean.**
10. **Always be on the lookout for fire hazards.**

—*Employees Bulletin*, Weirton Steel Co.

NEW MACK hauls 22½ ton pay loads



● It's "bottoms up" with heaping loads and "profits up" through low-cost hauling when Mack Model LV takes over on tough excavating and strip-mining jobs.

Clear through, in every part, this big, new Mack is engineered to move more yardage per load and more loads per hour.

There's power in abundance with its 200 h. p. diesel engine. Massive strength in its reinforced, alloy-steel, all-welded frame. Assured traction with Mack's exclusive Power Divider.

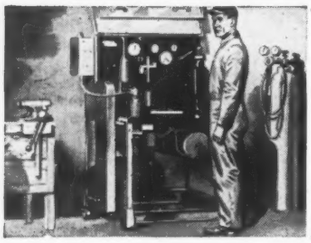
Mack Duplex transmission gives added mastery over grades and difficult terrain. Power steering and air assist clutch contribute to easy handling and high maneuverability. Final reduction of full-floating Planidrive type, is strong and rugged without excessive weight. Roomy, all-steel cab has offset driver's seat for better vision; is durably built for long-lasting comfort. Planned accessibility means lower maintenance, easier servicing.

Mack off-highway engineers will gladly advise you on the proper application of Model LV to your particular excavating job. Write or call your nearest Mack branch or dealer.

Mack

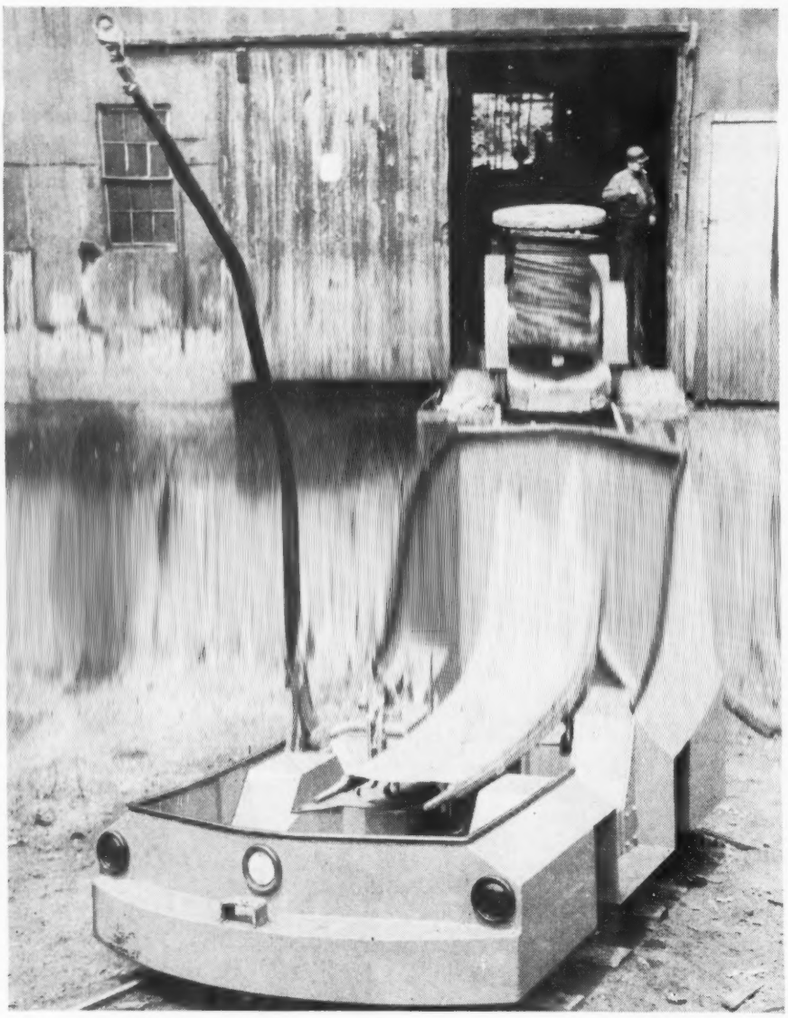
Trucks for every purpose

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.



Operating Ideas

Large Jeep Meets Transportation Needs



HOW THE JEEP-LOCOMOTIVE can be converted into an ambulance with room for four or more attendants to accompany the injured man to a first aid room.

SEATED ABOARD the 10-passenger jeep, are, left to right: Basil White, tipple inspector; Bob Lee, electrician; Floyd Burris, machinist; Bill Newell, supply man; Roy Gayhart, machine shop foreman and assistant electrician; Joe Fargo, repairman; Ray MacPhail, coal inspector; Wampus McCormick, shop worker; Dick School, repairman; and Ray Shinn, armature winder.

A TEN-PASSENGER jeep-and-locomotive unit serves numerous transportational needs at the Boone County Coal Corp., Monclo, W. Va.

The jeep, shown in the accompanying illustrations, was designed by Roy L. Gayhart, shop foreman and master machinist, and Harry E. Davis, chief electrician, and was built by the shop force. The unit was designed to replace the mine locomotive for making routine inspections and also to provide a conveyance for transporting an injured man, quickly and comfortably.

The motors and running gear used in the construction of the jeep were salvaged from used parts. The unit, equipped with 5-hp. single-reduction geared motors, is capable of speeds up to 15 to 18 m.p.h., on the level, and will climb any of the steeper grades in the mine. A Jeffrey chain machine controller, and 150-watt 110-volt sealed-beam Westinghouse headlights and resistors are among the other essential parts used. The jeep is completely fitted with anti-friction bearings, and, for the comfort of the passengers, each of the four journal boxes is equipped with two springs—a total of eight springs.

The jeep is stationed at a strategic point in the mine where it can be easily located by the dispatcher. Any man capable of operating a regular locomotive can manipulate its controls. In fact, it is far simpler to operate than a locomotive.

The jeep has already been used on numerous occasions. The mine foreman may use it in an emergency, or he may direct the machine men to use it to go in ahead of the regular mantrip. A pumpman sometimes takes it when he needs to make a routine check, or carry oil and repair parts to the pumps. Occasionally, the wireman may use it for transporting tools and wire when making short extensions. Probably the jeep's most valuable benefit will be to transport injured men. Its construction is such that a stretcher bearing an injured man can be locked securely in place and there is room for at least four attendants to accompany him to the first aid station.

The jeep-locomotive, in serving these various transportation needs, is expected to prove a good investment, both economically and because it will be replacing other locomotives that can be returned to their intended jobs.

- KING KOAL underground CONVEYOR BELTING was developed and is being manufactured by Hamilton Rubber Mfg. Corp., to keep pace with the advent of underground conveyor belt systems.
- In every KING KOAL BELT is incorporated the essential qualities for economical conveying of coal with the positive assurance of long and uninterrupted service.
- For the ultimate in coal mine conveyor belting, specify KING KOAL CONVEYOR BELTS by

KING KOAL CONVEYOR BELTING

- Resists severe impact . . .
- Has high tensile strength
- Is flexible
- Troughs easily
- Won't gouge easily
- Is mildew-proof, won't rot
- Is excellent for long and short hauls
- Runs true on idlers
- Is not affected by weak acids or alkalis

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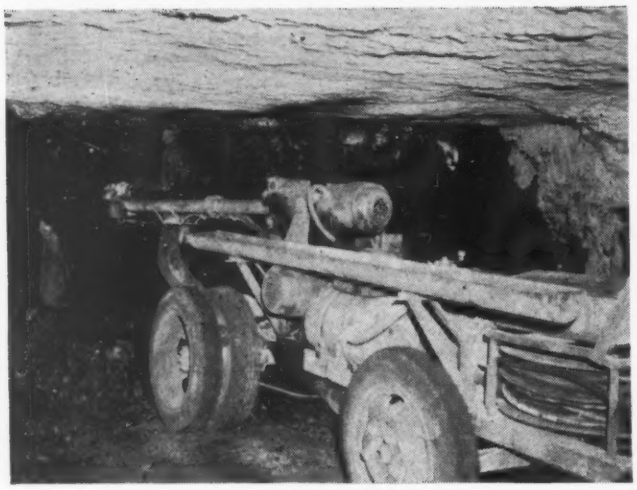
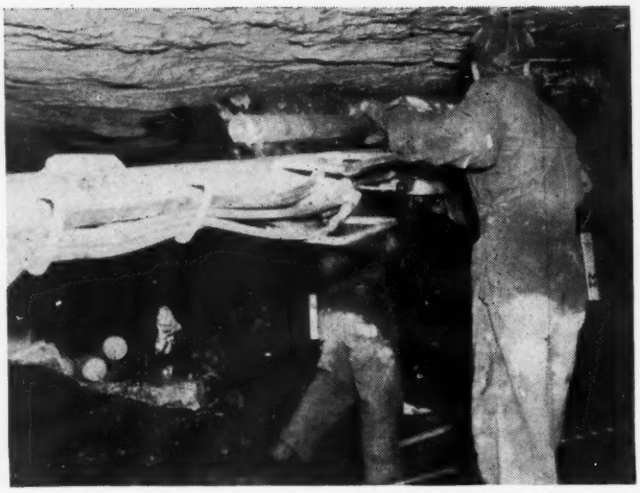


THE NEW CONTROL CENTER is halfway up the boom on Wattis drilling machines.



CLOSE-UP of the control center showing guards and hose and cable brackets.

Moving Controls Saves Time

TO SAVE TIME by permitting both crew members to work up front, controls for boom and drill operation on the Sullivan CD-16 rubber-tired drilling machines used at the Wattis mine of the Lion Coal Corp., Wattis, Utah, have been moved up on the boom itself, as shown in the accompanying illustrations.

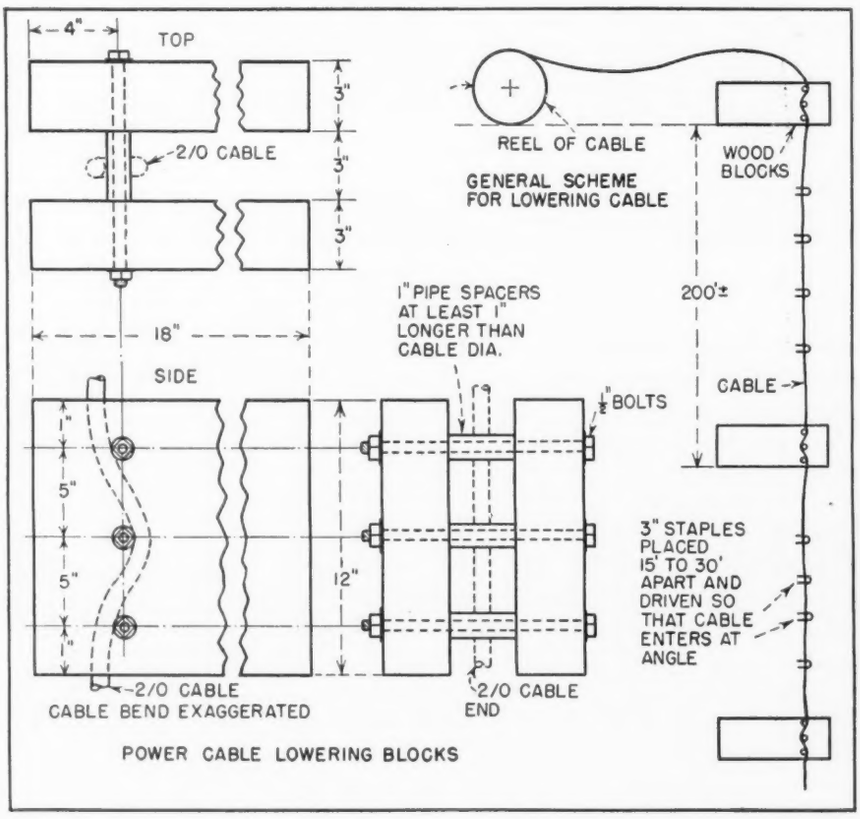
The mount for the controls is welded on the side of the boom, with guards above and below. Cables and hoses are held in brackets also welded onto the boom. Thus, instead of one man staying back to operate the controls, leaving all the face operations to the other, both now are free to work at actual drilling.

Power Cable Lowered With Friction Blocks

THIS SIMPLIFIED METHOD of lowering power cable as described by C. L. Moore, chief electrician, United States mine, Bingham Canyon, Utah, recently was reported in *Engineering & Mining Journal*. It was used to lower a 600-ft. length of 2/0 5,000-volt Geoprene cable in a vertical shaft, in preference to conventional methods requiring messenger cables and a hoist and the use of more men.

As shown in the sketch, the reel was mounted on the shaft station and allowed to rotate freely on a 3-in. pipe. No braking was provided except for manpower. The end of the cable was threaded through a set of two wood blocks mounted on a platform over the shaft. (See detail drawing of blocks.) Bolts in the blocks were spaced far enough apart so that the bend in the cable was not excessive, but still provided resistance to the cable's movement down the shaft. Additional friction was provided by threading the cable through 3-in. staples driven at 15- to 30-ft. intervals in shaft timbers.

The lowering crew consisted of two men on the station at the reel, one man on the station to relay signals, one man to guide the cable and drive staples, the main hoist engineer, and a supervisor. The cable moved through the blocks and staples as a unit, and coiling of short sections was unnecessary. Total time to lower the cable was less than two hours. Because of pipes and cables in the shaft, the position of the power cable was changed several times in the 600-ft. distance. This might have proved difficult with the customary messenger cable, but with the system described above, the cable was lowered without any trouble.



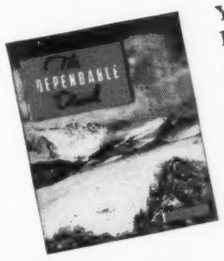
It is believed that a larger cable, and one of much greater length, can easily be lowered by this method. In fact, it has been used to lower a 3-wire No. 4 cable 1,000 ft. long.

What makes a job Tough

Heaped loads . . . heavy grades . . . soft fill. That's when Cummins Diesels "pay off" . . . hauling more coal or overburden at low cost.

CUMMINS *Dependable* DIESEL

SINCE 1919, PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

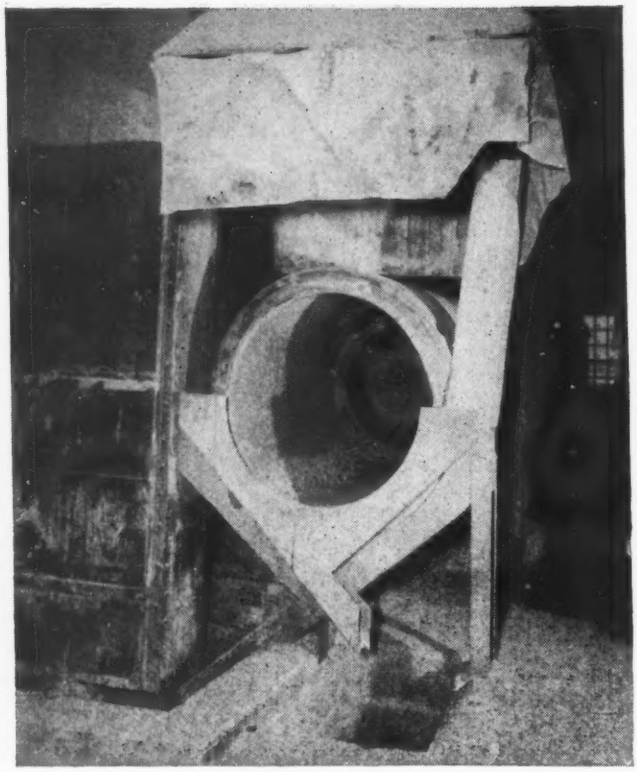


Your Cummins Dealer will show you other examples of the performance of Cummins Diesels in the current issue of *The Dependable Diesel.*

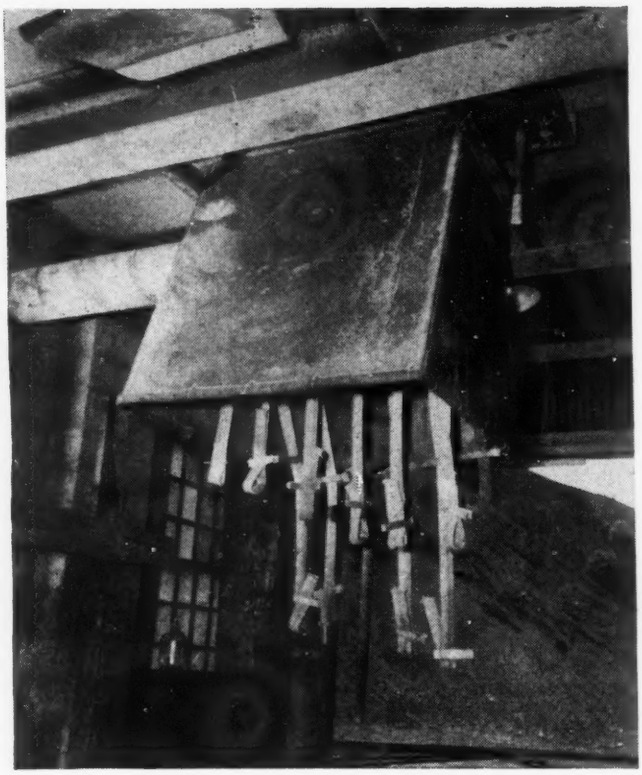
George Huss, Centralia, Pa., finds Cummins Diesels better for his job. Mr. Huss uses 17 Model HB-600 Cummins Diesels in Model HC165 Sterling trucks, and 15 Model HBID-600 and NHBS-600 Cummins Diesels in Model 28 FD, 3 TD and 8 TD Euclids.

On the Huss job near Good Springs in the Pennsylvania anthracite fields, Cummins-powered trucks haul coal on the four-mile round trip from pit to tipple and average 175 tons per unit each seven-hour shift.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA



This hood collects the dusty air at the discharge end of the dryer, where a 1/8-in. screen in the dryer takes out the oversize particles. The sand passing through the screen goes into the bucket elevator and is discharged into the 85-ton sand-storage silo.



At the car, another hood collects the dust rising from the dry sand as it is piped into the GI cans. Iron-ore tailings are often used in place of sand. Locomotive crews say the iron in the tailings acts as a conductor between the wheels and rails.

Ralph K. Ardoline's job, that of plant operator, is a more pleasant task since the installation of the exhaust hoods.

The sand-drying equipment is located in the breaker yard at Loree No. 5 Colliery.

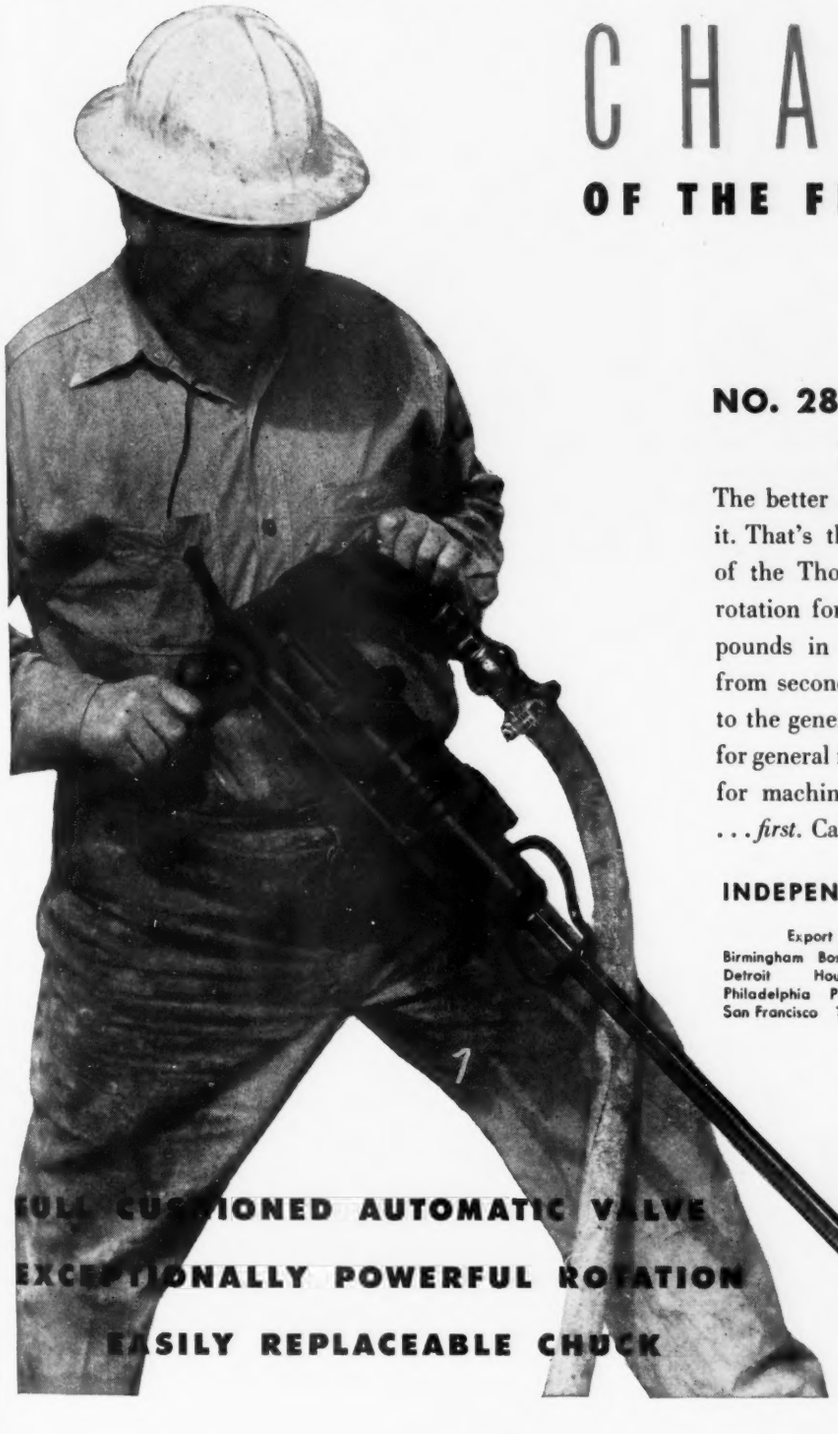
Exhaust Hoods Protect Sand-Drying Personnel at Loree

EXHAUST HOODS and compressed-air-induced drafts expel the sand-laden air at Loree's sand dryer and eliminate the hazards of silicosis, says Charles E. Kelley, assistant outside foreman, Loree colliery, The Hudson Coal Co., Plymouth, Pa.

The hoods, shown in the accompanying illustrations, are located at the discharge end of the dryer (*Coal Age*, November, 1946) and also where the sand containers are filled in the car. The fogging of the air with fine particles of sand was particularly bad at those places before the hood collectors were installed.

The hoods are vented to separate stacks, but compressed air is used to insure a positive draft to entrain the dust particles and carry them outside of the building.

FOR POWER . . . FOR HANDLING EASE



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Thor

NO. 28 SINKER ROCK DRILL

(30 Pound Class)

The better the tool the more places you'll find it. That's the secret of the amazing acceptance of the Thor "28"—its exceptionally powerful rotation for such a small and compact drill (30 pounds in 18-¼") have carried its popularity from secondary drilling in the mine and quarry to the general construction field . . . to industries for general maintenance and drilling anchor holes for machinery installations. Try the champion . . . *first*. Call a Thor dealer for a demonstration.

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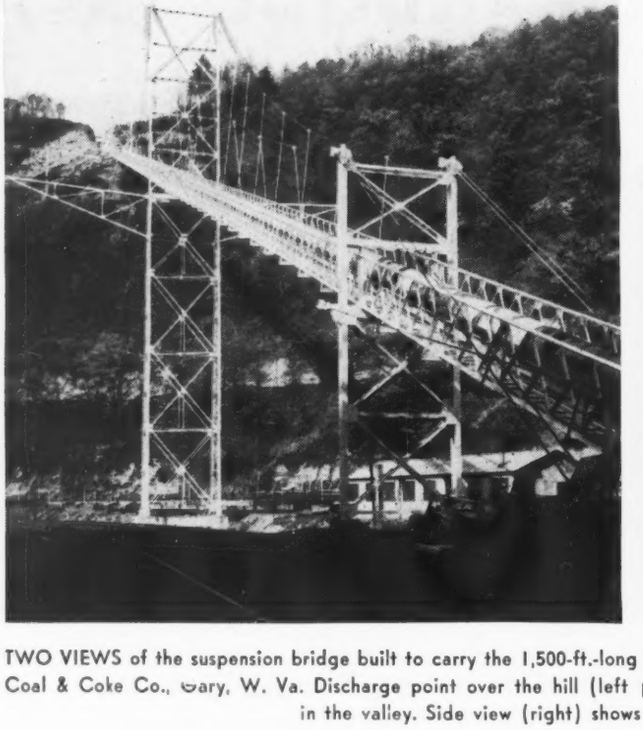
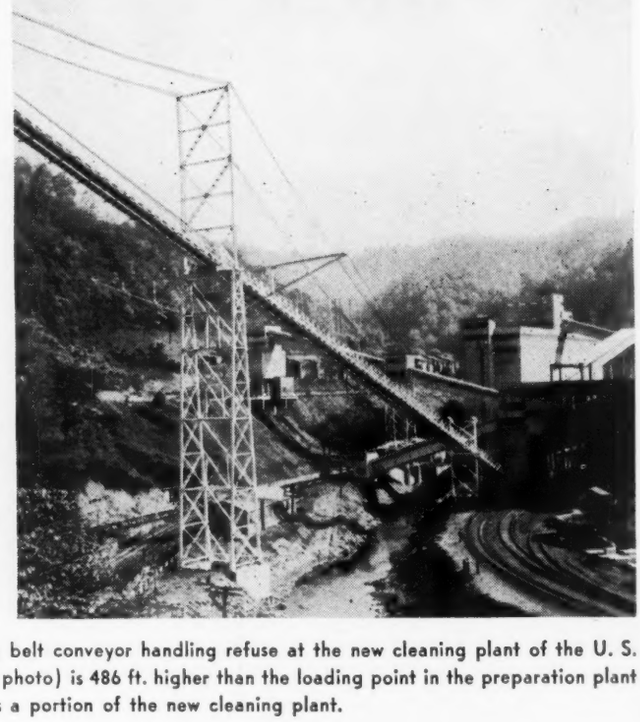




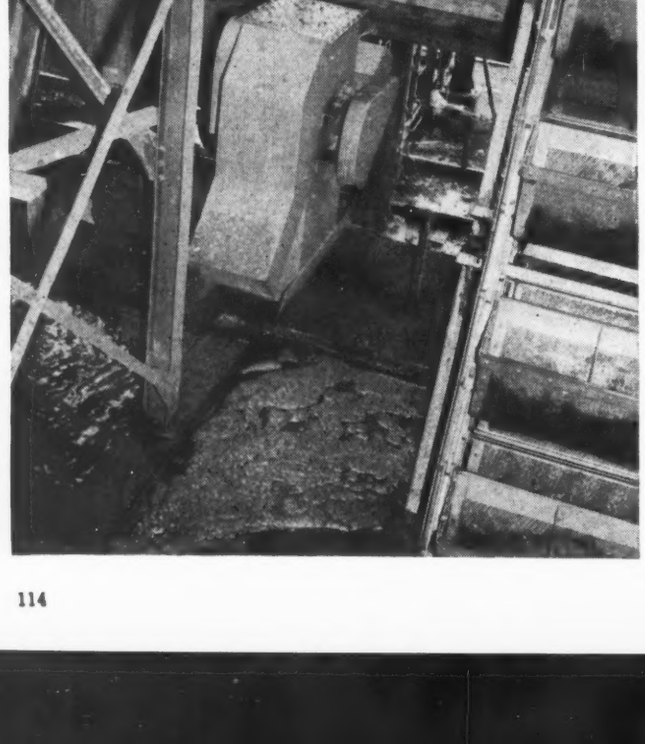
TWO VIEWS of the suspension bridge built to carry the 1,500-ft.-long belt conveyor handling refuse at the new cleaning plant of the U. S. Coal & Coke Co., Gary, W. Va. Discharge point over the hill (left photo) is 486 ft. higher than the loading point in the preparation plant in the valley. Side view (right) shows a portion of the new cleaning plant.

Suspension Bridge Lifts Belt Conveyor at 19-Deg. Angle

THIS UNUSUAL belt-conveyor system utilizing a suspension bridge inclined at a 19-deg. angle recently was put into operation to handle refuse from the new central cleaning plant of the U. S. Coal & Coke Co., Gary, W. Va. Total length of the 30-in. specially made belt is 1,500 ft., with the discharge 486 ft. above the loading point. Belt speed is 400 f.p.m. and belt capacity is 350 tons of material per hour, according to the report.

An engineering feature of the bridge, which at one point is 300 ft. above the ground, is the use of catenary sway braces attached to the outriggers at the main supporting towers to stabilize the structure against side sway in high winds and thus prevent spillage from the belt.

The belt, which was designed and built specially for this operation by the Goodyear Tire & Rubber Co., Akron, Ohio, contains more than a million linear feet of finely stranded steel cables, laid side by side in the belt's core, to provide the carrying strength required, according to the manufacturer. The 3,000-ft. endless belt was built in three sections and vulcanized on the job. It is weather-protected by a corrugated metal hood visible in the illustrations.



Special Elevator Cleans Out Boots

THE DISAGREEABLE and time-consuming job of cleaning out the boots of dewatering elevators to permit repairs or take care of other troubles has been materially eased by the installation of a special dewatering elevator at the Black Diamond preparation plant of the Black Diamond Coal Mining Co., Black Diamond, Ala.

Two boots serve two dewatering elevators at Black Diamond. The special dewatering elevator, as shown, is installed between them so that it can pull from either and discharge to either. Thus, if trouble is encountered with one main elevator, the dewatering elevator is started and pulls the coal and water from that boot, discharging it to the other.

The special elevator is a short high-speed unit with solid buckets powered by a 10-hp. motor. It can clean out a boot, removing some 10 to 15 tons of coal and about 1,000 gal. of water in approximately 30 minutes.

INSTALLED BETWEEN the two elevator boots, the short high-speed dewatering elevator can clean either one of them out in about 30 minutes, discharging to the other.

THE CHANCE CONE . . .

Cleans Large Sizes-up to 12"

THE HEART OF THE PREPARATION PLANT

Lump coal up to 12 inches in diameter is cleaned with ease and high efficiency with the CHANCE SAND FLOTATION PROCESS. This eliminates the costly and inefficient method of attempting to clean these sizes by handpicking, and greatly reduces the cost of cleaning the large size coal.

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—anywhere in the mine!

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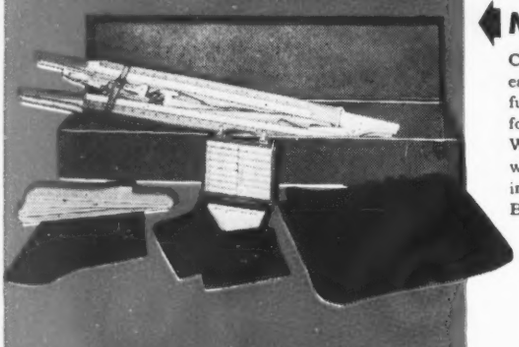
FIRST AID EQUIPMENT

M.S.A. MINERS FIRST AID CABINET

Completely equipped. Contains assortment of first aid materials and supplies suited to requirements of the mine hospital or dressing station. Contents conform to materials recommended by the United States Bureau of Mines for first aid treatment. Designed for wall mounting, or transportation when required. Bulletin FA-74.

M.S.A. *All-Weather* FIRST AID KITS

Sturdy steel cases are dustproof and moistureproof, with a replaceable rubber gasket sealing edges when closed. Contain complete assortments of unit-packaged first aid materials; each unit package contains one or more complete treatments, without waste. The unit packages fit like blocks in the cases. Bulletin FA-101.

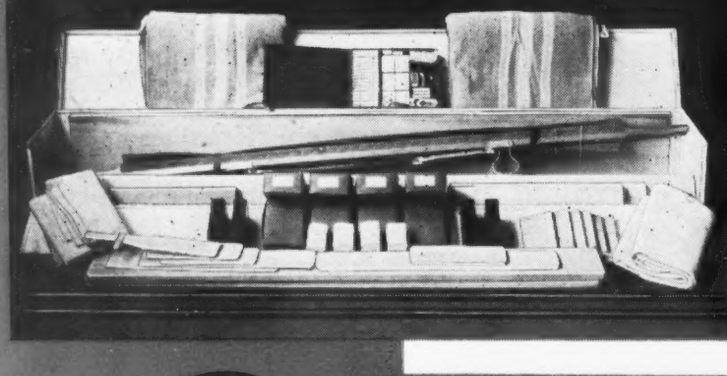


M.S.A. FOLDING STRETCHER OUTFIT

Complete emergency outfit in durable steel case—suitable for easy transportation underground. Folding stretcher opens to full-size army type. Included are a wool and a rubber blanket, four wood splints, two Heating Pads, and a 16-unit M.S.A. All-Weather First Aid Kit. Case is finished in red crackle enamel with white lettering. Dimensions are 56" x 12⅝" x 8". Carrying handles at ends and brackets for mounting are standard. Bulletin FA-77.

M.S.A. REDI-HEAT BLOCK

Safe emergency heat source for first aid applications—always ready for immediate use; produces top heat in 60 seconds—employs no liquids. Replaceable Redi-Heat charge is unaffected by heat, moisture, weather or temperature—has unlimited storage life. Wrapped in cloth, the M.S.A. Redi-Heat Block provides heat for approximately one hour per charge. Bulletin FA-92.



. . . and for FIRST AID TRAINING

THE M.S.A. CONTEST OUTFIT

Strong steel box contains complete list of materials recommended by U. S. Bureau of Mines for first aid practice and contest work. Specially designed to facilitate transportation, prevent loss of materials, and aids neatness and efficiency. The box is made of 24 gauge steel, finished in white, equipped with strong handles on each end. Write for details!

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News Round-Up

Lewis Proposes Share-the-Work Plan; U.M.W.A. Outlines New Demands

John L. Lewis warned the bituminous industry that the union intends to divide working days equally among its members if a slump in coal demand brings a production slow-down. This warning, plus a free hand for Mr. Lewis in framing new contract demands, an increase in the union's monthly dues to $4, a sizeable boost in salary for Mr. Lewis and other officials and attacks on both major Presidential candidates and a number of candidates for Congress, highlighted the annual U.M.W.A. convention in Cincinnati Oct. 1 to 12.

Mr. Lewis' threat to impose a share-the-work plan on the industry if rising stocks cut back working time was voiced in his declaration that "if there are only three days' work in the industry, we will all have three days' work."

In addition to heaping praise on Mr. Lewis, convention delegates upped his salary to $50,000 a year and declared his birthday, Feb. 12, a holiday in bituminous mines. Salaries of vice president Thomas Kennedy and secretary-treasurer John Owen were boosted to $40,000. Likewise, arguing that union membership now is worth more than it used to be, delegates raised miners' monthly dues to $4 and the initiation fee to $50, increasing the national union's income to some $14,000,000 a year.

Mr. Lewis was given a blank check for drawing up demands for his next contract meeting with the operators. However, it was suggested that his new demands would include a 35-hour week without loss of pay, a lower retirement age for pension eligibility and possibly a boost in the welfare-fund levy.

Mr. Lewis' attacks on President Truman and Governor Dewey, as well as congressional candidates, were based on their stand on labor issues, particularly the Taft-Hartley Act, which also was denounced.

Along with the revelation that the union paid personal fines levied on Mr. Lewis in recent injunction decisions, it was announced that union attorneys have asked the Federal Court of Appeals for return of $1,420,000 in fines imposed on the union last spring.

Later in Washington, attorneys for the union and the Southern Coal Producers Association revealed that the association has dropped its failure-to-bargain charge against the union growing out of Mr. Lewis' refusal to talk with representatives of the southern operators last spring.

•

Potentialities Studied For Synthetic Fuels

Four area surveys under a government program to determine the productive capacity for synthetic fuels in those areas were scheduled to be completed by the end of November. The surveys, being financed under special appropriations to the army totaling about $1,500,000, will be turned over to the Interior Department.

Three areas being surveyed by a private engineering firm, Ford, Bacon & Davis, are the Western Kentucky bituminous coal fields, northwestern Colorado shale fields and the southeastern oil section. The fourth, being handled by army engineers, covers the bituminous coal fields of southeastern Montana.

The reports, which are expected to be made public in an effort to interest private capital, will contain such data as: (1) availability and quality of raw materials; (2) water supply; (3) power supply; (4) availability of transportation, housing and labor; and (5) potential markets.

•

Two Added Hikes Sought In Coal Freight Rates

The nation's railroads last month placed two separate petitions before the I.C.C., seeking an increase of 40c. per ton in the present anthracite and bituminous coal and coke shipping rates instead of the increase of 25c. per net ton asked for Aug. 27 (*Coal Age*, October, p. 125). An increase of 13 percent on general traffic also is requested in the latest petition.

On Oct. 1 they filed a petition seeking an increase on short notice of 8 percent on general traffic, with maximums for certain commodities, and a jump in the rates for coal and coke of 30c. per net ton, or 34c. per gross ton, and asked that the previous petition be discontinued. The I.C.C. scheduled hearings to begin Nov. 30.

Later, in the middle of the month, two additional pleadings were filed with the I.C.C. A motion asked that the 8-percent hike on general freight and the 30c. per net ton raise on coal be authorized by the commission on short notice and without hearing. A petition requested that the previous petition be supplemented and amended to call for a 13-percent jump for general traffic and an increase in rates for coal and coke of 40c. per net ton.

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Ohio Coal Man Presents Stripped Farm to Club

A 121-acre farm from which coal has been stripped recently was presented by C. C. Fay, Cleveland coal operator, to the Jewett (Ohio) School Board for use of members of the Future Farmers of America attending the high school. The farm has 6 acres of spoil banks, 12 acres of timber, 40 acres of pasture and 40 suitable for planting of row crops. An additional 75 acres of spoil banks may be presented later, it was reported.

The spoil banks will be laid out for contour planting with the cooperation of state and federal agricultural experts and experiments in reclamation of the land will be carried on. The F.F.A. members will have the opportunity to gain actual experience in all types of farming.

•

Caravan Moves Lumber In Anthracite Tie-Up

A caravan of 25 trucks and five passenger cars formed by a group of independent lumber wholesalers and producers was reported Oct. 16 to have delivered timber to mines near West Nanticoke, Pa., whose timber supplies had been cut off Oct. 13 by a

suspension of deliveries put into effect by the Anthracite Timbermen and Lumbermen's Association. The union's attempt to tie up timber deliveries in the area was said to be an effort to force higher prices for timber, which in turn would permit payment of higher wages being sought for the timber cutters.

While the caravan encountered pickets at various points, the deliveries were made without incident. The union announced that some anthracite mining operations had agreed to pay the prices asked.

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Workers in Kentucky Mine Remove 20 Miners' Bodies

The recovery crew that has been working some time to remove the bodies of 20 miners entombed in the Kentucky Straight Creek Coal Co. mine near Pineville, Ky., since an explosion Dec. 26, 1945, reportedly brought to the surface bodies of 15 of the men Oct. 18. The remaining five bodies were removed Oct. 21, it was reported, after a delay required for rebuilding ventilation in the low-oxygen area in which they were found.

•

Eastern Kentucky Group Holds Monthly Meeting

At the regular monthly meeting of the Eastern Kentucky Electrical and Mechanical Institute, held Oct. 11 at the Grand Hotel, Hazard, Ky., dinner was followed with talks by three institute members and a discussion participated in by the capacity crowd attending.

During the evening, C. A. McKinney, district superintendent, Kentucky & West Virginia Power Co., talked on "Handling the High Line With Safety." Frank Forsythe Jr., electrical engineer, described "A.C. Phase Conversion" and how for small mines three-phase motors can be used on single-phase rural lines. Sam Tucker, superintendent of maintenance, Elk Horn Coal Corp., discussed "Practical Methods of Overcoming Commutation Troubles in D.C. Motors."

•

Record Attendance At Hanna Picnic

A crowd of more than 12,000 miners and members of their families attended the annual picnic of the Hanna Coal Co., St. Clairsville, Ohio, held Sept. 17. Grand prize for the day was the award of a new automobile to the miner selected by lot from the hundreds of Hanna miners who had worked for a year without an accident.

Six-Weeks Stoppage Ends at Virginia Mine

A work stoppage at the Glamorgan, Va., mine of the Peerless Coal Co., called Aug. 11 to assist in organizing non-union sublessees of the company. (*Coal Age*, October, p. 166), ended Sept. 27 when more than 300 miners employed by the company started back to work. Details of the settlement were not made public, but unconfirmed reports indicated that all strip-mine workers on the company's leases would be brought into the union.

Previously, Sept. 13, the mining company had filed an unfair labor charge with the N.L.R.B. against the local and district unions.

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Big Sandy-Elkhorn Group Has Annual Safety Meet

Fifteen mine teams and one Girl Scout and one Boy Scout team participated in the Annual Safety Day of the Big Sandy-Elkhorn Coal Mining Institute held at Pikeville, Ky., recently.

In the first aid contest, the team of the Consolidation Coal Co. (Ky.) McRoberts, Ky., took first place, with that of the Beaver Coal & Mining Co., Drift, second, and that of the South-East Coal Co., Seco, third.

The team of the Republic Steel Co., Pikeville, Ky., captured top honors in the mine rescue competition, with the team from the Inland Steel Co., Wheelwright, Ky., placing second.

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Personal Notes

George C. Trevorrow, formerly general superintendent of mines for the Duquesne Light Co., Pittsburgh, Pa., has been named general superintendent of coal mines for the Wheeling Steel Corp., Wheeling, W. Va. Mr. Trevorrow succeeds **W. E. Monks**, who, because of ill health, is relinquishing some of his duties but will continue with the organization in an advisory capacity. Mr. Trevorrow, who is a graduate of Penn State College in mining engineering and has had about 25 years' experience in the coal industry, will have full responsibility for the operation of both Wheeling Steel and Consumer Mining Co. coal mines, under G. W. Hewitt, assistant vice president in charge of the department of raw materials.

C. W. Thompson has been named assistant manager of the Weirton Coal Co., Isabelle, Pa.

James E. Elkin, assistant general superintendent of mines, Duquesne Light Co., Pittsburgh, Pa., has been advanced to general superintendent of mines for the company, succeeding George C. Trevorrow.

A series of executive promotions within the Island Creek Coal Co., Pond Creek Pocahontas Co. and affiliated companies, brought about by anticipated increases in tonnages from the companies extensive development program that have necessitated increased and realigned executive responsibilities, have been announced by James D. Francis, president, and Raymond E. Salvati, vice president of operations.

John J. Foster, general manager, Island Creek, has been named assistant vice president, with headquarters at Huntington, W. Va. In his new position, Mr. Foster, who first joined Island Creek in 1911 in the accounting office, will direct the industrial and public relations functions of the companies.

Charles E. Walker, general manager, Pond Creek Pocahontas, has been appointed general manager of Island Creek, with offices in Holden, W. Va., succeeding Mr. Foster. Mr. Walker started with Island Creek in 1920 as a machineman and has held various supervisory positions with the company, becoming general superintendent of Pond Creek in 1940 and general manager in 1945.

R. Glenn Lazzell has been named assistant to the vice president of operations, with offices in Huntington, and will handle specialized operating and engineering problems, with emphasis on new developments. Mr. Lazzell joined Island Creek in 1922 and since January, 1945, has been general superintendent.

William Haslam, superintendent, Rock House division, Island Creek, has been made manager, Kentucky division, Pond Creek Pocahontas. For some years, Mr. Haslam was general manager of the Marianna Smokeless Coal Co.

Hubert Barber, superintendent, Holden division, Island Creek, has been appointed manager, Bartley division, Pond Creek Pocahontas. Mr. Barber first went to work for the company in 1916 as a mail boy during school vacations and has been a member of the supervisory force since 1930.

William Diamond, general superintendent, Marianna Smokeless Coal Co., Marianna, W. Va., has been advanced to manager of that company. Mr. Diamond, who joined the company in 1940, was previously industrial engineer and mine superintendent at Marianna.

Thomas Mitchem has been advanced from mine superintendent, mine No. 23, to superintendent, Rock House division, Island Creek. Mr. Mitchem has held mine foreman and superintendent positions with Island Creek since joining the company in 1927.

Michele DePietro Jr., superintendent, Mine No. 22, has been made superintendent, Holden division, Island

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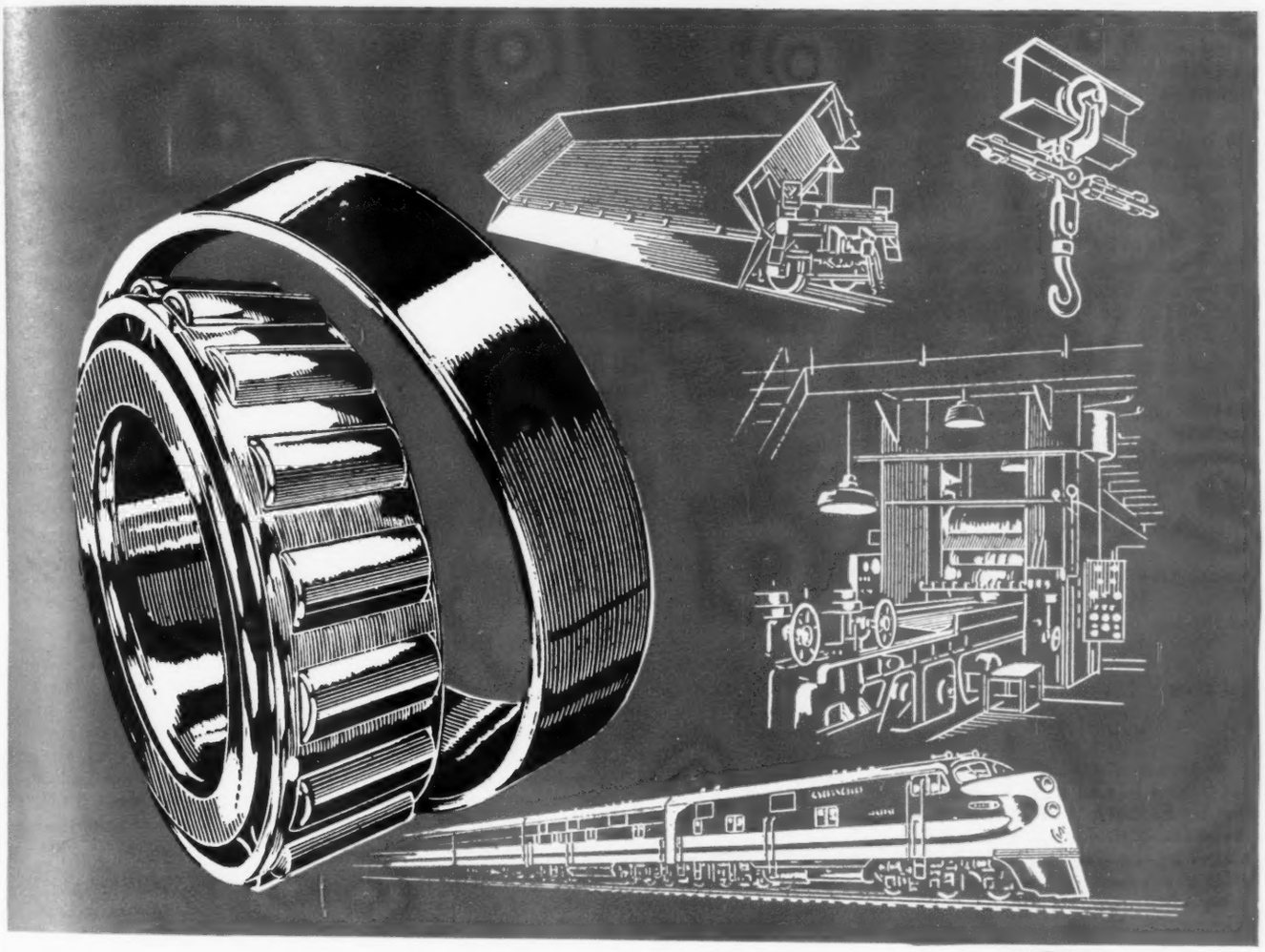

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Creek. Mr. DePietro returned to the company following his discharge from the army as a lieutenant colonel in 1946 and was superintendent of Mine No. 20 prior to his transfer to Mine No. 22 last June.

Nicholas T. Camicia, superintendent, Mine No. 7, has been named superintendent, Mud Fork Division, Island Creek. Mr. Camicia was mine superintendent at Marianna Smokeless Coal when he entered the army in 1941. On his discharge as major in 1946 he joined the Island Creek operating department and the following year was made superintendent of Mine No. 7.

M. Edwards Baugh, formerly vice president, has been elected president of the Jonathan Coal Mining Co., Philadelphia, to succeed the late Jonathan P. Edwards.

Paul R. Maxey, superintendent, Montcoal mines, Mining Division, Armco Steel Corp., Montcoal, W. Va., since 1944, has been appointed division engineer, succeeding **A. W. Asman,** resigned. Mr. Maxey has been associated with the company since 1926 and formerly was engineer and general mine foreman at the Nellis mine. **Alva E. Oakley,** formerly night foreman, Montcoal Mines Nos. 1, 5 and 6, has been named superintendent of Mines Nos. 1, 2, 4 and 5, to replace Mr. Maxey. He joined the company in 1934 and previously held various supervisory positions.

Wendell L. Evans, Wanamie, Pa., and **Arthur Howells,** Glen Lyon Pa., have been named mine inspectors for the U. S. Bureau of Mines in Pennsylvania. Mr. Evans has been employed by the Glen Alden Coal Co. and prior to his new position was assistant mine foreman, Wanamie No. 19 colliery.

E. B. Wagner, electrical engineer, Lehigh Valley Coal Co., Wilkes-Barre, Pa., was planning to retire on Oct. 31, after more than 41 years of service with the company. He was expecting to take up residence at Daytona Beach, Fla.

Harry W. Montz has resigned as general mining engineer of the Lehigh Valley Coal Co., Wilkes-Barre, Pa., because of ill health. **J. M. Humphrey,** his assistant, has been named to succeed him as acting general mining engineer for the company. Mr. Montz joined Lehigh Valley in 1907 following graduation from Penn State College and, except for one period in the operating department, has served in the engineering department of the company since that time. Mr. Humphrey is a graduate of Lehigh University and is the son of J. M. Humphrey, former president of the company. He joined Lehigh Valley in 1923 and was division engineer for the Delano division before becoming assistant to Mr. Montz.

James H. Pierce, Pierce Management, Scranton, Pa., left for China Sept. 29, in connection with the mining program of the National Resources Commission of China. He was expected to return to this country about Nov. 15.

JOHN J. FOSTER, newly appointed assistant vice president of the Island Creek Coal Co., will handle industrial and public relations for the company and its affiliates.

W. E. Eynon, coordinator of training, Island Creek Coal Co., Holden, W. Va., and **W. S. Palmer,** superintendent, Mine No. 19, West Virginia Coal & Coke Corp., Omar, W. Va., were elected directors of the National Association of Foremen at the 25th anniversary convention recently held in Philadelphia.

Robert P. Bremner, a member of the raw materials department since last December, has been appointed mining engineer in the office of J. L. Mauthe, vice president in charge of operations for the Youngstown Sheet and Tube Co. and president of its subsidiary, Buckeye Coal Co.

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Obituaries

William C. Atwater Jr., 58, died Oct. 5 in the Doctors Hospital, New York City, following a heart attack. Mr. Atwater was president of the W. C. Atwater Co., established in 1900 by his father, who died in 1940, and also was president of The American Coal Company of Allegany County and the Mill Creek Coal & Coke Co.

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New Developments

•Acquisition or lease of more than 36,000 acres of coal lands in Pennsylvania and West Virginia by the Bethlehem Steel Corp. in a move to increase its reserves of low-volatile coal required for the production of metallurgical coke, was announced last month by E. G. Grace, chairman of the corporation.

In acquiring the reserves, Bethlehem purchased all the outstanding stock of the J. H. Weaver Co., which owns or holds under lease and operates approximately 12,000 acres of developed coal properties in Cambria and Indiana Counties, Pennsylvania, and also 1,400 acres of developed coal properties in Harrison County, West Virginia. At the same time, Bethlehem leased from the Clearfield Bituminous Coal Corp. approximately 23,000 acres of undeveloped coal lands in Cambria County, adjoining the Weaver properties.

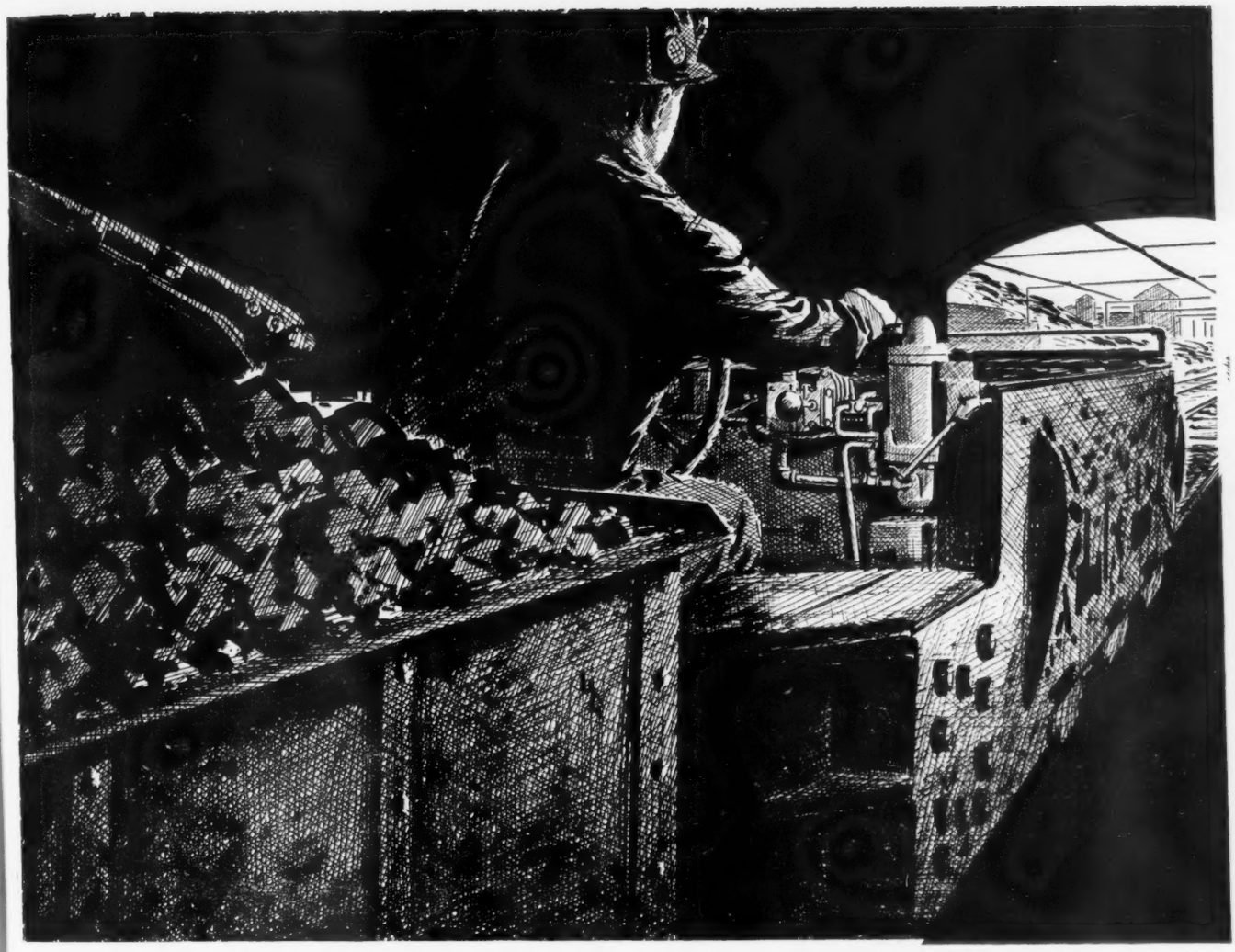
Included in the Weaver holdings were the entire operating properties of the Monroe Coal Mining Co., Revloc; Heisley Coal Co., Nanty Glo; and the Red Lands Coal Co., Heilwood. While operating at less than capacity because of the lack of manpower, the three companies last year were reported to have produced a total of 2,239,745 tons. Very few changes in personnel are to be expected, and it was understood that Jerome C. White, Ebensburg, who has been directing the Weaver properties at Revloc, Nanty Glo and Heilwood, will continue in charge under the new owners.

•Plans for doubling the daily production of the No. 9 mine of the Old Ben Coal Corp., West Frankfort, Ill., from 7,000 to 14,000 tons are reported to be under way, with an extensive construction program now being carried out. Hoisting of coal at the original shaft of the mine, closed since 1927, is to be added to the present output and the present mine force of over 550 men will be enlarged. In addition to the reconditioning of the old shaft, the program also includes extension of the height of the tipple over the original shaft, construction of a large sump at the bottom of it and the sinking of an airshaft for ventilation and as an escapeway.

•Development work on the new slope mine of the Franklin County Coal Corp., near Royalton, Ill., is expected to reach coal early next year, with actual production starting several months afterwards, according to a recent announcement by company officials. The 700-ft. slope will tap coal at 155 ft. underground and the coal will be transported to the surface by a belt conveyor and then hauled to company's preparation plant at Mine No. 7. It is understood that the company has available 1,800 acres of coal, sufficient for 10 to 12 years of operation for the new property. The construction work is being carried on by the Great Lakes Dredging Co. and by the coal company itself.

•Mifflin tipple, formerly operated by Blythe Bros. Construction Co., has been taken over by the Boone County Coal Corp., Sharples, W. Va., and is being operated as the Spruce tipple

(*Continued on p.* 124)



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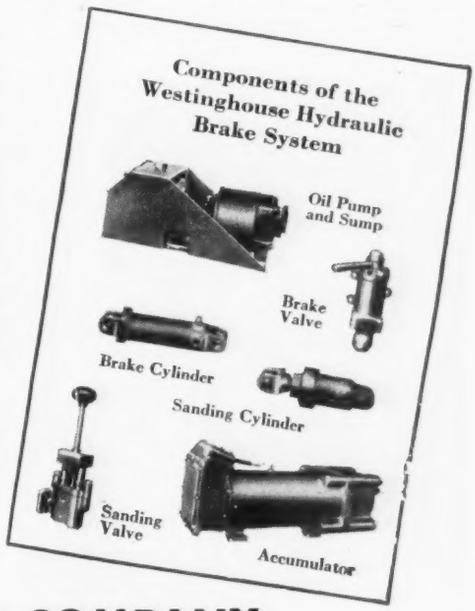

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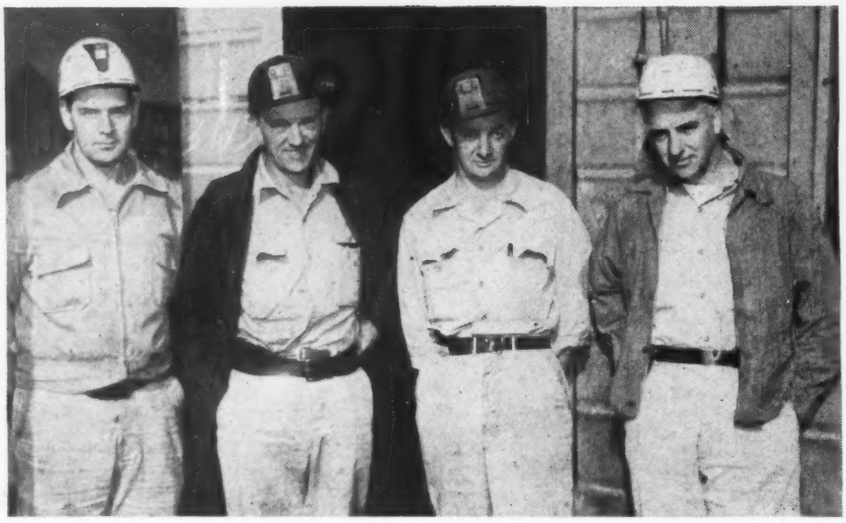


Chelsea Noel (left), assistant superintendent, W. B. Hayes, general superintendent, H. B. Porter, general outside foreman, No. 3 mine, and J. M. Venters, assistant superintendent of maintenance, Amherst Coal Co., at the mine office, Accoville, W. Va.

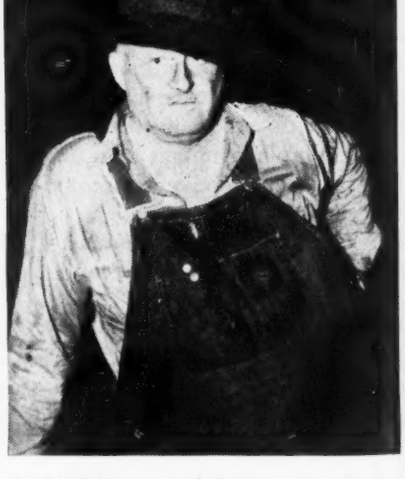
L. A. Crump, supt., Seneca No. 4 mine, Seneca Coal & Coke Co., Catoosa, Okla.

COAL MEN

E. F. Brown (left), chief electrician, Fred Spriggs and Wayne Griffith, electricians, No. 1 mine, Elk Creek Coal Co., Emmett, W. Va.

Jas. Lastoka (left), asst. foreman, Hi-Way mine, Louisville-Lafayette Coal Co., Broomfield, Colo., and Carl Guenzi, hoisting engineer.

W. M. Kerr Sr. (seated, left), Kerr Coal Co., Cameo, Colo., Dean Harris, Charles Houck, master mechanic; standing: Martin Mansberger (left), carpenter, Merle Field, motorman, Duard Cregger, mine foreman, Jack Kissel, and W. M. Kerr Jr.



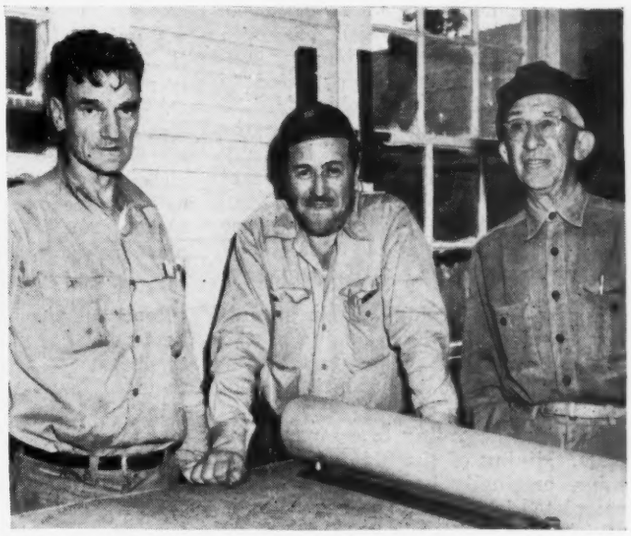
G. W. Reitz, general foreman, Jewel mine, Jewel Mining Co., Paris, Ark.

A. W. Schneider, supt., Carbon Nos. 4 and 5 mines, McAlester (Okla.) Fuel Co.

ON THE JOB

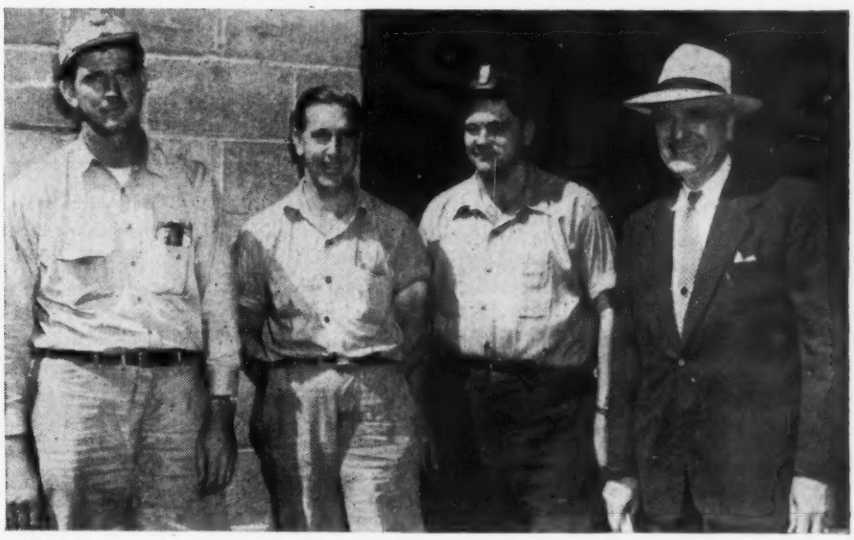
E. C. Spencer (left), chief electrician, No. 6 mine, George Jones, superintendent of company maintenance, J. M. Mauk, outside foreman, McGregor mines, and H. M. Perry, shop foreman and chief electrician, No. 2 mine, Logan County Coal Corp., Slagle, W. Va.

Beavlee Morgan (left), pit foreman, Jackson No. 2 mine, Jackson & Squires Coal Co., Bates, Ark., and L. H. Brady, dragline operator.



H. W. Forsyth (left), engineer, Ralph M. Lamb, gen. mgr., and C. W. Strickland, vice president, Utilities Coal Co., Kistler, W. Va.

Charles Daniels, superintendent, Redwing mine, Colowyo Coal Co., Axial, Colo.



E. M. Davis (left), construction superintendent, Elk Creek Coal Co., Emmett, W. Va.; H. N. Lawson, contractor, Montgomery, W. Va.; John E. Davis, general manager, Elk Creek; and C. H. Chase, district sales manager, Toledo Scales Co., Charleston, W. Va.

to screen and prepare coal from Hewitt's Creek wagon mines operating in the Chilton seam. About 600 tons of coal a day is being shipped from the tipple, with production coming from at least four mines. It is understood that Boone County is insisting that the companies install machinery to furnish a higher percentage of lump and insure more thorough cleaning at the face, as required by present market conditions.

•Start of a new development program that will include the opening of a sixth level to replace the fifth level nearing exhaustion has been announced by the Hammond Coal Co., Girardville Pa. Two inside slopes are being driven down from the fifth level to open virgin seams of coal, with the cost of the sixth-level slopes and the driving of tunnels estimated at about $500,000. In addition, the company is constructing a new boiler house at an estimated cost of $260,000 and is understood to be purchasing new stripping equipment valued at $250,000. The new program, which has been under consideration by company officials for some time, is expected to extend the life of the colliery by 25 years. The contract for driving the east slope has been awarded to Harry D. Swartz, Inc., Weston Place, and that for the west slope to Stanley Newhook & Co., Aristes. The boiler house is being constructed by the Coxe-Stoker Engineering Co., Hazleton, Pa.

•A new seam of high grade bituminous coal at the Nonac mine of the Colorado Fuel & Iron Corp., near Canon City, Colo., went into production last month after a year of development, according to company officials. Mining of the old seam at the mine, originally begun in 1886, was completed last July. The new seam is 42 in. thick and is about 100 ft. above the old. The new seam is said to contain a steam and domestic coal of a far better grade than that previously mined. A new slope 2,000 ft. long has been completed and coal is being mined with newly installed shaker conveyors and duckbills. Extensive changes in the tipple and cleaning plant were recently completed and the rebuilt tipple reportedly has almost twice the capacity of the old one.

•Consolidated Coal Co. (Ky.), Jenkins, Ky., has awarded a contract to Roberts & Scheafer Co. for construction of a tipple and other facilities expected to cost about $1,000,000 at Deane, Ky., on the new Rockhouse branch of the L. & N. and Beaver Creek branch of the C. & O. being completed from Wayland, Ky. Work is expected to be begun in the near future, with first coal shipments scheduled for the fall of 1949.

•Work on the new central cleaning plant of the Warner Collieries Co. at Big Mountain, W. Va., has been started, according to reports. The new plant, which will have a capacity of 350 t.p.h., will prepare coal from the Hurricane mine at Mammoth and from the new Emily mine now under construction in Donaldson Hollow. The plant will wash, size and mechanically clean five sizes of coal, which can be blended with a mixing conveyor.

•The Elkhorn-Hazard Coal Lands Co., Whitesburg, Ky., recently organized by R. R. Crawford, Rena Crawford and N. J. Lucas, is reported to be planning development of coal land in the Rockhouse-Breedings Creek areas of Letcher and Knott Counties. A tipple and headhouse will be constructed, it was said, and the company also will lease part of its holdings.

•Red Creek Coal Co. has been organized in Pike County, near Jenkins, Ky., by John Bentley, Joe A. Charles and H. K. Pinson, with a capital of $25,000 and bonded indebtedness of $60,000. The company plans to develop two sizable truck mines with an initial capacity of 500 tons a day. Mr. Pinson will be in charge as manager.

•A group of business men headed by B. J. Kern, of Regina, have reportedly purchased for $300,000 the mine of the Lakeside Coals, Ltd., located at Robb, Alberta, Canada, 33 miles south of Edson, Alberta. The mine was closed four years ago following a disastrous fire and it is estimated that about $250,000 will be required to place it back in operation. The mine produces a type of hard coal.

•Reorganization of the Canadian Collieries (Dunsmuir) Ltd., and direction of operations from British Columbia, Canada, instead of from Great Britain, were announced last month. A large portion of the company's stock has been transferred from Great Britain and is now held in British Columbia. Norman R. Whittal, Vancouver, is to succeed J. A. Boyd, Montreal, as president, and H. R. Plommer, formerly general manager, is to be managing director. Arthur Cross and R. W. Steele, Montreal, and C. Gordon Cockshutt, Brantford, Ont., have resigned from the board of directors.

YOUR COMPANY, TOO?

MANY COAL-MINING COMPANIES make it a point to write us of personnel changes on their staff for inclusion in COAL AGE'S "Personal Notes" section, as well as other news of their company, such as new mine developments, safety and production achievements, annual staff functions, etc., accompanied by pictures where suitable and available. They know that friends, business acquaintances and employees all enjoy reading such news in COAL AGE. You, too, are invited to write us whenever the occasion arises—it takes only a minute. Job changes from the individuals concerned also are welcome. Address: News Editor, COAL AGE, 330 West 42nd St., New York 18, N. Y.

Association Activities

Hazard Coal Operators' Association, Hazard, Ky., has elected Lewis A. Hopper secretary-treasurer, succeeding the late A. E. Silcott.

Coal Producers' Association of Illinois has reelected Walter C. Gill president of the association. Also elected were B. H. Firth, vice president, and Paul Halbersleben, secretary-treasurer. B. D. Wilcox and Messrs. Gill, Firth and Halbersleben were named members of the state executive board.

Bituminous Coal Research, Inc., is planning to set up an office in Columbus, Ohio, to provide closer contact with the numerous research projects being handled for it by Battelle Memorial Institute. The new office, which will be in charge of Elmer R. Kaiser, also will handle development of residential smokeless heating equipment and B.C.R.'s cooperative activities with stove, furnace and boiler manufacturers.

Central Pennsylvania Coal Producers' Association and Eastern Bituminous Coal Association, at a meeting held in Bedford Springs, Pa., Oct. 14, reelected Charles O'Neill as president and Walter A. Jones as secretary-treasurer. More than 175 representatives of member companies attended the day-long meeting, which consisted of business sessions and committee meetings.

New River Coal Operators' Association, at its 46th annual meeting Oct. 14, elected the following officers: president, J. M. McCauley, general manager, The New River Co.; vice president, L. C. Campbell, vice president, Coal Division, Eastern Gas & Fuel Associates; treasurer, P. M. Snyder, vice president, Coal Division, E. G. & F. A.; and secretary, S. C. Higgins; Named members of the executive committee were: Messrs. McCauley, Campbell, Snyder, C. P. Anderson, S. Austin Caperton, Owen W. Cox, L. Ebersole Gaines, J. W. Garvey, R. H. Morris and F. H. Morton. Guest speakers at the meeting, which included business and committee sessions, lunch and dinner, included Joseph E. Moody, president, Southern Coal Producers' Association, and James W. Haley, general counsel, National Coal Association.

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Slate Fall Kills Three In W. Va. Man Trip

Three men were killed Oct. 4 and 12 others injured, one critically, when a piece of slate reportedly 50 ft. long and 3 ft. thick fell on a man-trip in the No. 1 mine of the Ogla Coal Co., Coalwood, W. Va. According to preliminary reports, the slate was dislodged after a tool car in the man-trip carrying 26 men jumped the track and tore out timber supports.

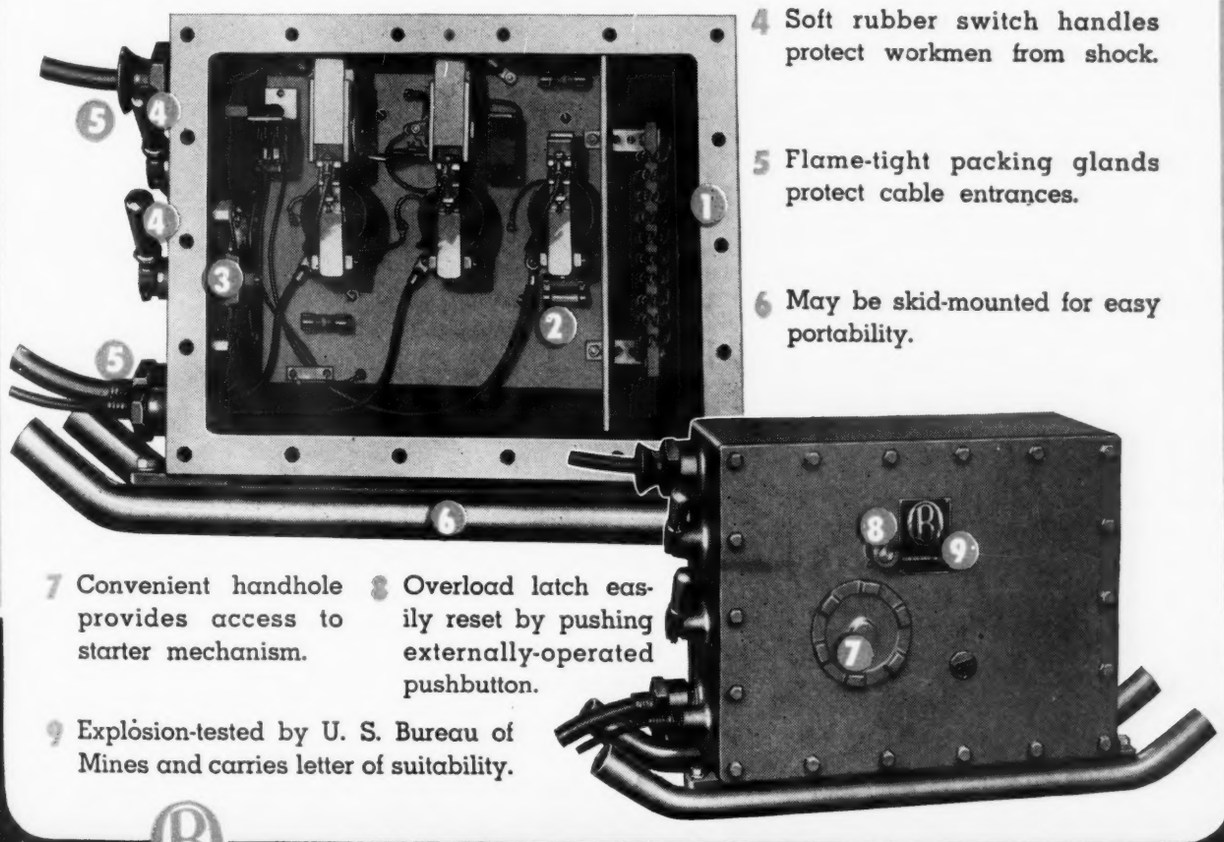
Here's a Mine Starter that's built to do a Mine Job!

TAKE A LOOK AT THESE MINE FEATURES OF THE O-B TYPE-BDG GAS-PROOF MOTOR STARTER

1 Welded steel case built to withstand explosive pressures in excess of 90 lbs. per sq. in.

2 Compensated Counter EMF timing assures positive starting regardless of load.

3 Built-in reversing switch conserves space.



4 Soft rubber switch handles protect workmen from shock.

5 Flame-tight packing glands protect cable entrances.

6 May be skid-mounted for easy portability.

7 Convenient handhole provides access to starter mechanism.

8 Overload latch easily reset by pushing externally-operated pushbutton.

9 Explosion-tested by U. S. Bureau of Mines and carries letter of suitability.

Write for free Descriptive Booklet 834M

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co. Ltd., Niagara Falls, Ont.

Coal and Business Activity

		1948 to This Date	1948 Over 1947, to Date
Est. anthracite prod., wk. ending Oct. 9....	1,188,000	44,450,000	+0.2%
Est. bituminous prod., wk. ending Oct. 16..	12,000,000	461,651,000	—5.3%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Sept. 1, 1948	Day's Supply	Aug. 1, 1948	Sept. 1, 1948	Aug., 1948	July, 1948	Aug., 1947
Electric power utilities.....	21,107	80	18,551	15,739	8,203	7,701	7,466
Byproduct coke ovens.....	10,289	38	8,975	5,482	8,349	8,233	8,033
Beehive coke ovens.....	†	†	†	†	965	697	897
Steel and rolling mills.....	1,166	51	1,134	1,128	706	663	736
Cement mills	1,328	57	1,364	894	719	721	672
Other industrials	18,810	69	17,579	15,434	8,498	8,155	8,644
Railroads (Class I).....	8,685	36	8,388	6,522	7,467	7,408	8,527
Retail dealers	2,672	15	2,148	1,958	5,496‡	5,170‡	5,058‡
Total	64,057	49	58,139	47,157	40,403	38,748	40,033

Source: U. S. Bureau of Mines. †Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, week ending Oct. 16	196.2	193.3	188.6
Steel ingot capacity (% of capacity).....	99.1	96.1	97.1
Electric power output (million kw.-hr.).....	5,482	5,426	4,946
Crude oil production (daily avg., 1,000 bbl.).....	5,586	5,294	5,268
Misc. & L.C.L. carloadings (daily avg., 1,000 cars).....	87	84	93
All other carloadings (daily avg., 1,000 cars).....	62	64	67
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)	405.5	420.7	453.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100)	275.6	277.6	283.2
Prices, domestic farm products (B.L.S., Aug., 1939 = 100)	326.2	340.2	397.3
Prices, finished steel composite (*Steel*, ton).....	$95.05	$95.05	$75.41
90 stocks, price index (Standard & Poor's Corp.).....	128.7	124.1	124.5

*Date of latest week for each series on request.

Hope for Silicosis Cure Is Reported by U.M.W.A.

New medical treatments that give reason to hope for an eventual cure for silicosis were described in a report issued Sept. 26 by Thomas Kennedy, chairman, Anthracite Health and Welfare Fund, U.M.W.A. Already, the announcement said, 500 silicosis victims who permitted themselves to be used as guinea pigs in experiments covering the past year have been relieved of much of their suffering under treatments developed by doctors at Jefferson Medical College, Philadelphia, Pa. The doctors are working under a $578,000 grant from the miners' welfare fund and have just completed the first year of a five-year program.

The new treatment, described by Dr. Burgess L. Gordon, clinical professor at the medical college, and credited to Dr. Hurley L. Motley, director of the hospital's Barton Memorial library, combines use of a nebulizer with an intermittent positive-pressure cycling valve. Up to this time, it was explained, nebulizers, which force a fine mist laden with prescribed drugs into the lungs, have been ineffective because damaged lung tissues of silicosis sufferers have lost their resiliency and thus have made deep breathing impossible.

To overcome this difficulty, Dr. Motley combined the nebulizer with a valve consisting of two rubber diaphragms of different sizes that open and close automatically as a constant pressure of air is run through them. The valve, installed in a mask and fed with oxygen from a pressure tank, pumps oxygen and prescribed drugs into the patient's lungs and draws carbon dioxide out. The valve, in effect, does the patient's breathing for him. Four treatments per day averaging 15 minutes each are given the patient over a period of about two weeks.

A novel feature of the research equipment used in studying the disease is a motorized treadmill geared to various speeds and inclined to simulate physical conditions in mine passageways. The treadmill is used to test patients' breathing.

In addition to helping anthracite miners, some 10,000 of whom are said to suffer from silicosis in various stages, the new treatment may be helpful also to workers in other industries such as iron, lead, zinc and granite.

•

Cumberland Valley Group Holds Annual Safety Meet

Some 2,200 miners and their families attended the annual first-aid and mine-rescue meet Sept. 24-25 at Middlesboro, Ky., under the sponsorship of the Cumberland Valley Mining Institute in cooperation with the U. S. Bureau of Mines, Kentucky and Tennessee state departments of mines and the U.M.W.A.

In the mine-rescue contest, the Black Star team of the Black Star Coal Corp., Alva, Ky., captained by Earl Lane, took first place, closely followed by the team of the Nu-Rex Coal Co., Lafollette, Tenn., captained by Witt Allen, and the Marion team of the Black Diamond Coal Mining Co., Marion, Tenn., captained by Ellis Yount.

The Kettle Island team of the Pioneer Coal Co., Kettle Island, Ky., captained by Blaine Cooper, won first place in the first aid contest with a score of 100 percent in a field of 14 teams. The Black Star No. 1 team of the Black Star Coal Corp., captained by Herman Mayfield, took second place with a score of 99.8 percent; and the No. 1 team of the Clear Fork Coal Co., Fonde, Ky., captained by Ed Brassfield, was third with a score of 99.5 percent.

Directors of the meet were M. C. McCall, supervising engineer, U. S. Bureau of Mines, Birmingham, Ala.; J. A. Welch, chief, Tennessee Division of Mines; and Earl R. Maize, safety director, National Coal Association. C. H. Dodge, engineer-in-charge, U. S. Bureau of Mines, Jellico, Tenn., was supervisor of the first-aid contest; and Noah Jackson, Kentucky Department of Mines and Minerals, and M. L. Davis, U. S. Bureau of Mines, Norton, Va., were chief judges.

Prizes for the meet were donated by the institute, the Mine Safety Appliances Co., the National Coal Association, the Bituminous Casualty Corp. and the Coal Operators' Casualty Corp. Attendance prizes, including a 1949 Ford sedan, radio and other valuable articles, were presented at the close of the event.

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Research Planned on Coking Washington Coal

Research on the possible methods of using Washington state coal as a source of coke for making electrodes employed in aluminum reduction has reportedly been begun by the U. S. Bureau of Mines at Seattle.

It is hoped that the coal may be used to supplant the petroleum coke now being shipped to the state's four aluminum reduction plants from California and other points. The main problem in making the type of coke needed from Washington coal is the reduction of the high ash content, it is understood. The coal not only will be cheaper, it is thought, but its use would permit conservation of petroleum. With the area's aluminum reduction plants in full operation, an estimated 400,000 tons annually, a quarter of the state's present coal production, would be needed if a satisfactory process is developed.

The Permanente Metals Co. is understood to be carrying on its own study of local coal at its research laboratory at Trentwood, Wash., and its efforts will be coordinated with the work of the Bureau.

FAST WORKER— STEADY TOO!

Time saved means money earned on stripping jobs like this, so the Hiyasota Fuel and Stripping Company of Johnstown, Pennsylvania, went into action with a fleet of "Caterpillar" Diesel DW10 wheel-type Tractors pulling Athey PD10 Trailers — and how the earth and rock flew! Hauling 10-yard loads at speeds up to 18 m.p.h., they got the jump on overburden and overhead from the first load. And when coal is reached, the same equipment set-up is ideal for speeding it to the tipple or loading ramps.

But speed isn't the only factor that slashes costs. Economy of operation and day-in-day-out steadiness are important too. "Caterpillar" Diesel Tractors score on *all* counts, as their users will tell you from their own profitable experiences.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

FIELD TRIPS SUPPLEMENT TECHNICAL SESSIONS at the 1948 Indiana Coal Conference. Here, a part of the group attending the conference is shown at the new Green Valley mine of the Snow Hill Coal Corp.

Preparation and Utilization Indiana Themes

SUPPLEMENTING technical sessions with field trips to new mining properties, the Annual Indiana Coal Conference chose as the themes of the Sept. 23-24 meeting at Terre Haute, Ind., preparation, utilization and public reaction to coal. The conference was sponsored by the Indiana Coal Preparation and Utilization Society and the Ohio Valley Section of the American Institute of Mining and Metallurgical Engineers. Operations visited were the Green Valley mine of the Snow Hill Coal Corp. and dragline strippings of the Maumee Collieries Co.

With Mr. Miller officiating, following the address of welcome by Hugh B. Lee Jr., president of the Indiana Coal Preparation and Utilization Society and sales manager of the Maumee Collieries Co., the technical sessions were opened by a discussion of modern methods for mechanical handling of coal and ashes in the small boiler plant, by Carl E. Miller and H. Maurice Carlson, engineers, Battelle Memorial Institute, Columbus, Ohio. Chairman at this session was Wm. A. Mueller, chairman, Ohio Valley Section, A.I.M.E., and professor of metallurgy, Ohio State University.

Pointing out that the material was a preview of a booklet to appear in *Power* and *Operating Engineer*, both McGraw-Hill publications, Mr. Miller offered concrete examples of the savings possible in a number of small boiler plants. Good design, he stated, means the elimination of any trouble with competitive fuels by saving labor and providing the operator with an opportunity to work on achieving efficiency and lower cost. Now, with the increase in labor cost and the desire of labor for better working conditions, good design is meeting with an increasingly favorable reception, while the results insure a grateful coal user.

The possibilities of fine grinding as a means of reducing the ash in coal to below limits previously thought possible were discussed by Prof. Mueller on the basis of preliminary experiments. The results also indicate that the commonly accepted figures of 1 to 1½ percent for inherent ash may be too high. In his opinion, said Prof. Mueller, inherent ash may be well under 1 percent. Cleaning after such fine grinding brings in froth flotation, while the material might be utilized by caking, emulsifying with oil or the production of coal-oil balls by the Trent amalgam process.

What the public expects of the coal industry was analyzed by O. L. Scales, vice president, Enos Coal Mining Co. and president of the Coal Trade Association of Indiana, at the second session, presided over by M. A. Matthews, president, Templeton-Matthews Corp., Terre Haute. Among the points made by Mr. Scales as to what the public expects were: (1) a good supply of coal, (2) a solution of the industry's labor-relations problems, (3) 100-percent automatic heat and (4) lower prices for coal.

In the field of automatic heat, Mr. Scales contended, the industry is not quite holding its own because coal heat still is not truly automatic. Making it truly attention-free, however, is not as impossible as it might seem, and Mr. Scales urged earnest consideration of heat-service plans which relieve the householder of all responsibility for heating-plant operation.

Basing his address on the new plant being engineered for the Jones & Laughlin Steel Co., Nelson L. Davis, president, Nelson L. Davis Co., Chicago, discussed the heavy-media process for coal preparation. Describing the process and the various equipment units involved in it, Mr. Davis declared that it offered the best quality of coal with the maximum recovery.

Concluding the technical sessions, Dr. J. T. Rettaliata, dean of engineering, Illinois Institute of Technology, Chicago, discussed the coal-burning gas-turbine locomotive, prefacing his remarks on the locomotive proper with a brief history of gas-turbine development. While the diesel engine makes a very desirable power plant, the coal-fired gas-turbine locomotive possesses even more beneficial characteristics in the heavy traction field, and it is predicted that only by its adoption will the ultimate in locomotive design be achieved.

The expected fuel cost, when using coal, will be approximately half that of a diesel locomotive of the same horsepower, while lubrication costs should not exceed one-tenth. The purely rotary motion of the gas turbine will result in a minimum of vibration and maintenance. Other advantages include better relations between coal men and railroads, elimination of the use of water and a clear stack.

•

Lehigh Navigation Ups Retirement-Plan Benefits

An improved retirement and pension policy for 420 salaried employees of the Lehigh Navigation Coal Co., Lansford, Pa., recently was announced by Evan Evans, president, effective Oct. 1. The company, it was pointed out,

"Give us the tools..."

TO SURVIVE

America Must Have Better Tools

IN THE past twenty years the United States has failed to provide its workers with enough new tools and equipment.

To most Americans this statement will come as a shock—or will be doubted. We are quite complacent about our industrial equipment, for easily understood reasons.

Throughout the '30s we heard continuously the propaganda line that the United States had become a "mature economy." The job of equipping America with industrial plants and tools was said to be largely done.

Now, knowing that industry is spending billions to expand and rebuild its plants, many people assume that the result must be a first-class industrial system.

A further powerful inducement to complacency is the vastly *worse* industrial condition of most of the rest of the world. When Americans look abroad in almost any direction they see shattered plants and equipment. A natural reaction is that we are sitting pretty.

That is a dangerous reaction. Between depression and war, we have failed to build the tools and equipment we need. This condition is dangerous for three reasons:

1. *From bitter experience we know that national security depends first and foremost on the capacity and readiness of our industrial equipment.*

All of our plans for stabilizing prosperity assume a world at peace. The greatest menace to peace would be an unarmed America, unable or unwilling to keep herself strong and ready for defense—strong in spirit, in resources and in the all-important industrial plant and equipment.

2. *Whether Americans live well—or badly—depends directly on the kind and quality of tools used by American workmen.*

This is true for all workers, and for every worker—from a garage mechanic and his wrenches to a steel mill gang and its rolling equipment. In a monumental study of "America's Needs and Resources" the Twentieth Century Fund found this fact: The improvement in the real income of the American people has more consistently followed the amount of power used in industry than anything else. What the workman worked *with* determined, more than any other factor, the size of his pay envelope, and what it would buy.

3. *Our success in stabilizing prosperity will depend largely on what we do about building new tools and equipment.*

About 30% of our industrial workers are employed in producing tools and equipment. Steady employment for them is essential to our over-all prosperity.

How far have we fallen behind in providing new plants and equipment?

Estimates vary. Here is one rough estimate: If we had built new industrial facilities during 1930-48 at the rate we did in the prosperous '20s, we would have spent at least $100 billion more than actually we did.

To get a better and more complete measure of this deficit, McGraw-Hill is undertaking a survey of American Business' Needs for New Plant and Equipment.

Businessmen all over the nation are being asked to answer questions like this: How much

money would you need to put your plant in first class condition? How much are you planning to spend for new plant and equipment? Where do you expect to raise the money? The results will be reported later in this editorial series. Already the survey shows we have fallen many billions of dollars behind.

Some shortcomings are apparent to everyone. They are revealed in a lot of rickety transportation facilities and in rundown buildings.

Many other deficiencies do not come into general view. They are, for example, the antiquated machines in our plants. Of the privately-owned machine tools in use in 1945—when the last census of metalworking equipment was made by AMERICAN MACHINIST—54% were more than 10 years old. Their average age is higher today.

It is true that in recent years we have hit new highs in total national production. But we have done so by putting far more people to work than ever worked before . . . and by driving equipment to the limit of its waning endurance, sometimes beyond. It has not been done *primarily* in what is by all odds the best way to increase production—to use more and better and more modern tools and equipment.

Haven't we overcome much of this twenty-year deficit by rushing to build new plants since the end of the war?

No. For two clear-cut reasons:

1. The accumulated shortage is tremendous. The total of about $40 billion, which has been spent for industrial plant and equipment since VJ-Day, has not wiped it out.

2. Some key industries have had difficulty in getting the facilities they need. Take steel, for example—the industry that turns out our most basic industrial material. Its needs for new equipment are measured in billions of dollars. To pay for that equipment, it should have *risk capital*—money which people are willing to invest with a risk of losing for the sake of gain. For steel is an up-and-down industry. Earnings on its common stocks inevitably share both ways in those ups-and-downs.

Since the war, steel, in common with most of industry, has been unable to market new common stock successfully. Its outstanding stock is now selling for only about one-half the current net worth of the industry's present assets. With investors willing to pay only 50 cents on the dollar for its facilities, the industry can not readily sell stock to pay for *new* plant and equipment—at higher prices even than the old.

Why can't steel—and other industries—attract people who are willing to risk their money retooling America?

The full answer to that serious question must be left to future editorials in this series, for it involves many things . . . tax reform . . . mobilization of small savings . . . a new respect for corporate profits.

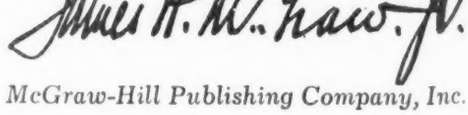
This first editorial seeks simply to emphasize two fundamentals:

First, our standard of living improves with the *quality* of our industrial equipment.

Second, American industry and American workmen badly need billions of dollars worth of better equipment *now.*

The American people must understand that *not only our continued prosperity but also our security as a nation depends upon giving American industry more and better equipment.*

"Give us the tools." This was Winston Churchill's cry for help to win the war. Only if we give American industry new and better tools will we have a chance to win abiding prosperity at home and good order abroad.

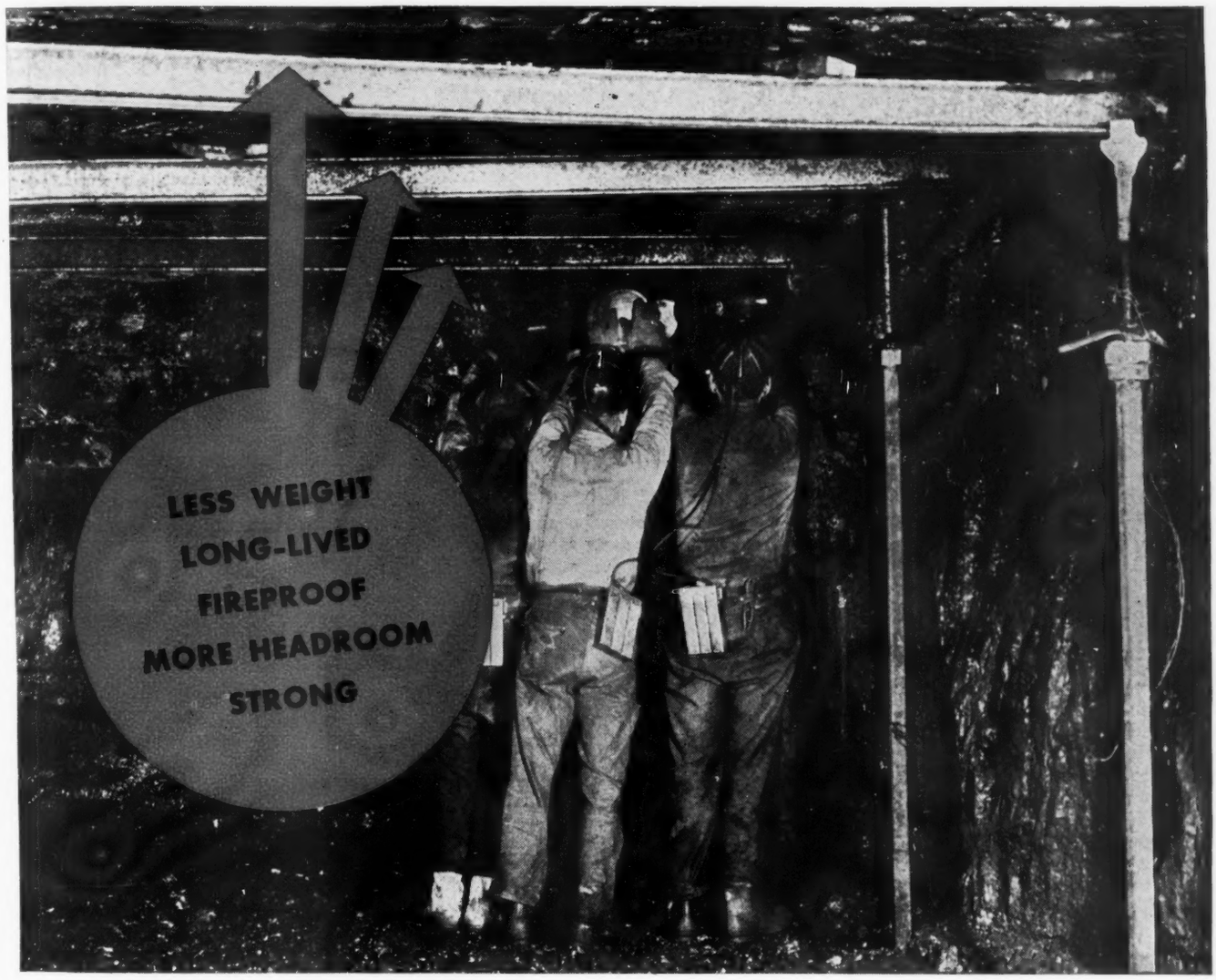


President, McGraw-Hill Publishing Company, Inc.

★ THIS EDITORIAL, and a series to follow, will be devoted to a single problem—how to provide American industry with the equipment needed to improve that envy of the world, the American standard of living. No more important problem confronts us today. Upon our wisdom in handling it depends not only the degree of our prosperity, but also our security as a nation.

LIGHTWEIGHT, LONG-LIVED, TROUBLE-FREE

Alcoa Aluminum Beams for Your Working Faces



Miners lift less dead weight when they set Alcoa Aluminum Header Beams at the working faces. Aluminum beams weigh less than ½ as much as steel or oak beams of equal strength. You can use Alcoa 61S-T6 Aluminum Header Beams again and again. They are long-lived . . . need no painting. Are fireproof and rotproof.

Although immediate delivery is not possible, due to the current metal shortage, you can lay your plans for lightweight timbering. Figure now on reducing timber weights and production costs in the future. ALUMINUM COMPANY OF AMERICA, 1763 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in 55 leading cities.

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

first set up a pension policy many years ago and long held the distinction of being the only anthracite producer to provide monthly benefits for retired employees.

The entire cost of the plan is borne by Lehigh Navigation and does not require employees to pay any portion of their salary toward it. Purpose of the program, according to the company, is to provide a fair and flexible retirement policy, so that every deserving employee can look forward to a guaranteed pension of substantial size.

Under the new plan, retirement age is set at 65 and a minimum of $100 monthly will be provided for employees with 20 or more years of service. Pensions in each individual case will be determined by management under the company's long-standing policy, with the minimum of $100 guaranteed. Employees with less than 20 years' service retiring at 65 will receive a pension, the amount of which will be determined by management. All salaried employees may retire or be retired by the company at the age of 65, or at any time after that age. The plan does not preclude retirement of an employee at an earlier age if warranted by special conditions.

•

Miner Cooperation Asked in Smoking Drive

In a circular letter dated Oct. 1 and addressed to all anthracite mine officials and mine workers, Richard Maize, Pennsylvania Secretary of Mines, asked for the help and cooperation of both mine workers and coal operators in the department's drive to eliminate the practice of smoking or carrying matches and smoking materials into gassy mines in the anthracite region.

The letter pointed to the department's efforts to eliminate the hazard (*Coal Age*, October, p. 168), and asked U.M.W.A. officials to circulate the information and urge the men to join in the drive.

•

Powhatan Presents Field For High School Sports

Plans were recently announced for the formal dedication, Oct. 30, of the new athletic field being presented to the Powhatan Point (Ohio) High School and Community by the Powhatan Mining Co. The field has been under construction for several months under the direct supervision of Roy W. Fox, general superintendent of the company. Considerable fill has been done on the six-acre field, so as to provide a level playing space.

The new field is equipped with permanent steel bleachers with a seating capacity of 2,000 and is surrounded with a 7-ft. steel wire fence. In addition to the football field, it is laid out for baseball and will later be laid out for track. An automatic score board with an electric clock and a press box are additional features.

First use of the new facility was scheduled for Sept. 25 when the "Powhatan Indians" were to meet the Cameron (W. Va.) High School team.

MEETINGS

- West Virginia Coal Mining Institute: 41st annual meeting, Nov. 19-20, Morgantown, W. Va.
- Harlan County Coal Operators' Association: annual meeting, Nov. 17, Harlan, Ky.
- Winding Gulf Operators' Association: annual meeting, Dec. 3, Black Knight Country Club, Beckley, W. Va.
- Coal Mining Institute of America: annual meeting, Dec. 9-10, Fort Pitt Hotel, Pittsburgh, Pa.

•

Safety Schools Opened For Miners and Officials

Two schools, one for miners and the other for company officials, were scheduled to get under way early last month in the anthracite region to help promote the reduction of accidents at the operations cooperating. The U. S. Bureau of Mines, in cooperation with the U.M.W.A. and the coal companies, is promoting the courses and supplying the instructor personnel and is expected to expand the schools to other operations as fast as the companies and unions accept them.

A safety course for miners at the Hazleton Shaft colliery of the Lehigh Valley Coal Co. was to begin Oct. 4 at the colliery. The other program definitely scheduled was an accident-prevention course for mine officials that was to start Oct. 2 at the Weston colliery of the Locust Coal Co.

•

Harlan Mining Institute Holds Safety Contest

The Black Diamond No. 31 team of the Black Mountain Corp., Kenvir, Ky., took first place in the mine-rescue contest at the region safety meet held Sept. 17-18 under the direction of E. A. Starling, safety director, Harlan County Coal Operators' Association. The team from the Closplint mine of the Consolidation Coal Co. (Ky.) was second-place winner.

In the first aid contest, the team from the Crummies Creek Coal Co., Crummies, Ky., was the winner, with the team from the Pathfork, Ky., mine of the Blue Diamond Coal Co. placing second. In the colored division, the team from the Perkins-Harlan Coal Co., Liggett, Ky., was first, and the team from the Closplint mine, Consolidation Coal Co. (Ky.) was second.

Penn Safety Meet Draws 39 Teams

Top honors in the sixth annual Pennsylvania State Safety Day and First-Aid Contest, among a field of 39 teams, each of which was a district winner, were taken by Team No. 1 of the Arcadia mine of the Clearfield Bituminous Coal Corp. The intensity of the competition and the performance of the contestants is indicated by the fact that only 0.41 percent in score separated the winning team and that placing seventh.

Second place in the contest went to Team No. 2 from Arcadia mine. Ranking third, fourth and fifth, respectively, were teams from the Wildwood mine, Butler Consolidated Coal Co.; Renton No. 3 mine, Pittsburgh Coal Co.; and Indianola mine, Republic Steel Corp.

The winning teams received a silver plaque from the National Coal Association and a trophy from the Mine Safety Appliances Co. Individual team members were awarded sterling-silver safety rings. Other winning teams also received awards and a feature of the day was an address on safety by Heath S. Clark, Rochester & Pittsburgh Coal Co.

•

Elk River Coal Pays First Miner Pensions

The first $100 monthly miner pension checks in the country were those issued by the Elk River Coal & Lumber Co., Widen, W. Va., delivered to five retiring miners late in August two weeks before payments were made from the U.M.W.A. Health and Welfare Fund, according to a statement in the company's publication, *The Widen News*. The checks were presented in person to the five men, who jointly have almost 122 years of service, by the president of the Employees' League of Widen Miners.

The company also pointed out that 14 other employees were entitled to retirement on a pension but "have declined that privilege for one of continuing to work in their respective positions."

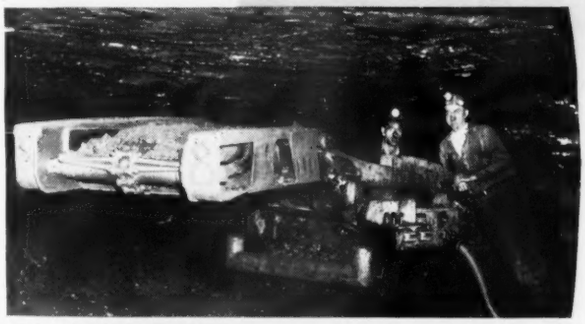
•

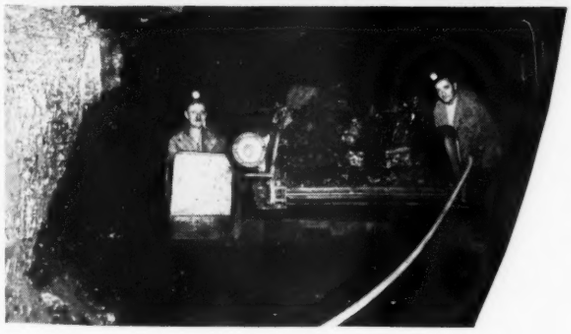
Gaines Named Chairman A.M.C. Program Committee

L. Ebersole Gaines, president, The New River Co., and retiring president of the National Coal Association, has been named chairman of the national program committee for the 1949 Coal Convention and Exposition of the American Mining Congress, to be held in Cleveland, May 9-12. An industrywide committee has been named to work with Mr. Gaines in developing a program covering both the economic and operating problems of the industry and was expected to begin its work early in November.

Two-way experience recommends Rome 60 MINING CABLES

4 AWG—133 Strand—2 Conductor Rome 60 Concentric Mining Machine Cable.





Rome Cable has had long experience in the manufacture of high quality mining cables. Its engineers are well versed in the problems of mine mechanization. What counts more, however, is the experience of mine operators who have come to depend upon Rome 60 Mining Cables for unfailing service and low-cost operation. It is from their experience that the Rome 60 line has gained recognition for superiority of quality and ability to stand the gaff of hard usage.

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Rome 60 Cables are available for all types of mine service, both grounded and ungrounded.

**Notarized test reports on production runs consistently show flame propagation well within Safety Code requirements.*

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

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Coal Progress N.C.A. Keynote

N.C.A. LEADERS—Charles A. Owen (left), Imperial Coal Corp., New York City, new president; John D. Battle, Washington, named to the new office of executive vice president; and L. Ebersole Gaines, The New River Co., Mt. Hope, W. Va., retiring president.

STRONG COAL MARKETS, wide use of bituminous for synthetic liquid fuels, better public relations for the industry and new advances in mining and utilization were predicted as nearly 500 coal men and representatives of related industries met in the 1948 convention of the National Coal Association in New York City, Oct. 5 and 6. At the same time, association members heard reports of the past year's progress in research, training, merchandising, land use and safety.

Charles A. Owen, president, Imperial Coal Corp., New York, was elected president of the association, succeeding L. Ebersole Gaines, president, The New River Co., Mt. Hope, W. Va. John D. Battle, formerly executive secretary, was made executive vice president and other officers were chosen as follows: vice president, George H. Love, president, Pittsburgh Consolidation Coal Co., Pittsburgh; secretary and general counsel, J. W. Haley, former chief of the legal division. Two new directors were elected, as follows: Harry LaViers, vice president, South-East Coal Co., Paintsville, Ky.; and Fred G. West, vice president, Butler Consolidated Coal Co., Wildwood, Pa.

"We are an industry which is progressive in its management and labor force efficiency, its high wage standards, its science and technology and its marketing," Mr. Gaines declared in his report to the association at the opening session Tuesday morning, with O. L. Alexander, president, Pocahontas Fuel Co., Inc., New York, presiding. Citing higher transportation and labor costs and inflationary trends in the national economy, Mr. Gaines sounded a call for sufficient profits to support more mechanization and mass-production techniques, and stressed the need for more capital to produce high-quality coal in sufficient quantity to fill growing fuel needs.

Looking to the future, Mr. Gaines pointed out that coal's outlook is made brighter by the great expansion of electric power output, which soon will make the utilities coal's biggest customer; by new industrial techniques in production and fabrication that will call for more power; and by the growth of a synthetic liquid fuels industry. To meet its responsibilities, Mr. Gaines stated, the industry has made big forward strides in cooperative research looking to better utilization; in further extension of mechanical mining; in the setting up of an organization to develop a continuous mining machine; in strengthening public relations through B.C.I., the speakers' bureau and Coal Heating Service; and in organizing a safety department and enlarging the vocational training program.

"Labor and management in bituminous coal agree that free enterprise, free from government intervention and control, is the only method by which the industry can meet the demands placed on it. Its own response to its duty to the country in past years, its rate of production per man, its progressive attitude on the development of labor-saving devices in production and use, as contrasted with the results of socialized coal mining in other countries, convinces the bituminous coal industry that it can work out its own problems and that it will continue to be the only dependable source of main fuel supply," Mr. Gaines concluded.

High living standards, good wages, good working conditions, liberty and opportunity are guaranteed by a free and open economy in which competition gives full play to initiative, ingenuity and courage, declared Governor Frank Carlson, of Kansas, featured speaker at the Tuesday morning meeting. The governor was introduced by Grant Stauffer, president, Sinclair Coal Co., Kansas City, Mo. Reciting the threats to the American system, Governor Carlson warned against high tax rates that stifle individual initiative, the infiltration of foreign systems that restrict freedoms and the danger of draining our nation's strength in indiscriminate support of foreign nations. Governor Carlson was followed by Mayor William O'Dwyer, of New York, who welcomed association members to the city.

High tribute to the several divisions and departments of N.C.A. was paid by John D. Battle, executive vice president, whose annual report continued the Tuesday morning session. Certain legal questions facing the industry and involving the Taft-Hartley Act, the wage and hour laws, the Robinson-Patman Act, the Supreme Court's recent basing-point decision and certain tax matters were stressed by Mr. Battle. He reviewed also activities by the association in behalf of the industry before legislative committees, federal investigative bodies and government bureaus and concluded that through the association the bituminous industry has won greater respect from the government, the public and the press while protecting its position as a basic industry operating under the free-enterprise system.

Efforts of the Committee on Interstate and Foreign Commerce to improve the railroad-car situation were reviewed by Laurence A. Tierney Jr., president, Eastern Coal Corp., Bluefield, W. Va., and chairman of the association's committee, who summed up offers by the committee to meet with railroad representatives in an effort to solve coal-transportation problems. Mr. Tierney also pledged action by his committee to see that coal is not called on to pay more than its fair share of the transporta-

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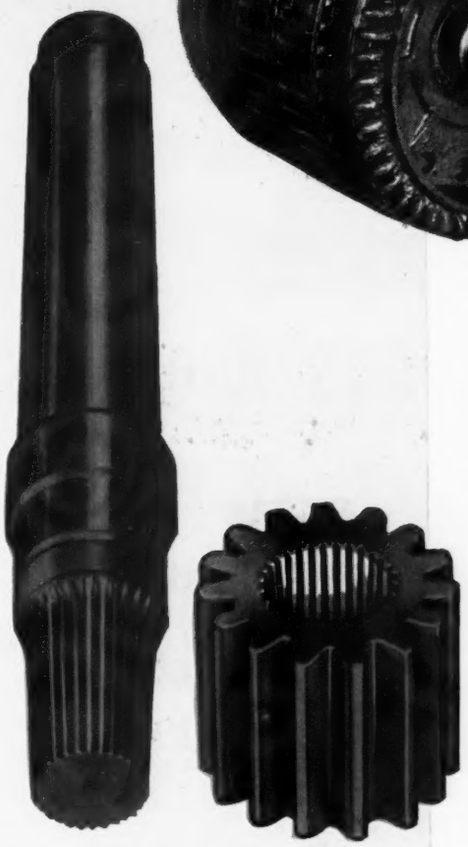

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tion bill of the railroads through further rate increases. Pointing out that in 1947 the railroads used over 733,000,000 gal. of diesel fuel against a little over 100,000,000 tons of coal and that the use of diesels for passenger and freight service is increasing, Mr. Tierney warned that the day is fast approaching when residual oil cannot be sacrificed for uses that can be taken care of by coal, reserves of which are adequate.

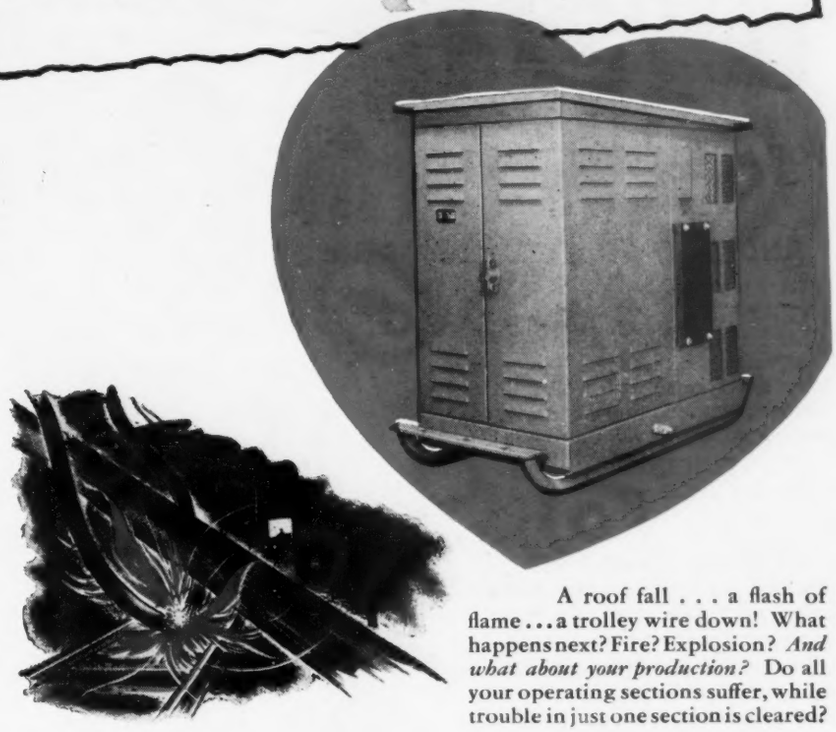
Coal research was the lead-off subject at the Tuesday afternoon meeting, with Mr. Stauffer presiding and J. E. Tobey, president, Appalachian Coals, Inc., Cincinnati, and chairman, technical advisory board, Bituminous Coal Research, Inc., summing up progress and displaying field-test models of newly developed burning equipment as evidence of recent research pay-offs. One piece of new equipment, the small radiant-type smokeless magazine heater, weighing only 170 lb. and retailing for about $65, releases 25,000 B.t.u. per hour; the other, a large circulating model, has a maximum hourly heat release of 40,000 B.t.u. and already is in quantity production. Along these same lines, a new furnace developed by B.C.R. but not displayed at the meeting averages 80,000 B.t.u. per hour for 12 hours between refuelings, Mr. Tobey stated. Common characteristics shared by all three developments are smokeless operation, magazine firing, long firing intervals and ability to handle any type of bituminous coal.

In addition, Mr. Tobey reviewed B.C.R. work in the development and testing of residential stokers and heating and steam-raising plants for small industrial installations; progress in the use of coal for tobacco curing; developments in installing over-fire air jets and improving locomotive air supply, cinder collection, fuel performance and handling of fuel; and liaison with sales and technical groups. Mr. Tobey warned industry representatives that the pay-off in research often is slow and asked for patience and continued financial support of B.C.R. by the industry. Meanwhile, he urged, more executives should take a personal interest in promoting the manufacture and sale of new products growing out of B.C.R. research.

With a $250,000 fund subscribed and Gerald von Stroh, former assistant manager, Development Engineering Division, Lukens Steel Co., as program director, the drive to design and build a continuous mining machine that will load coal off the solid, without drilling or shooting, directly into mine cars or onto conveyors has been launched, declared C. E. Lawall, assistant vice president, Chesapeake Ohio Ry., and chairman, Mining Development Committee.

The committee, Mr. Lawall pointed out, expects to maintain and operate its own laboratories for the most part, making use, however, of any

THE *Heart* OF { PROTECTION / PRODUCTION



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A rugged, completely dependable breaker, the KSC was developed especially for the mining industry. It is compact in construction and flexible in operation; it can be readily moved as mining progresses and centers of loads change. It is completely metal enclosed for safety and for prevention of unauthorized adjustments, yet is readily accessible for inspections and maintenance.

The KSC operates on circuits which can be fed in either direction, and it opens at first sign of short or overload—reclosing automatically on a return to normal line conditions. Voltages can be safely improved throughout the system by tying all feeders and trolleys into one network. Sections help one another by raising the diversity factor for the entire system, yet—with the KSC installed—shorts cannot be fed by distant substations, and substations are quickly separated when disturbances occur.

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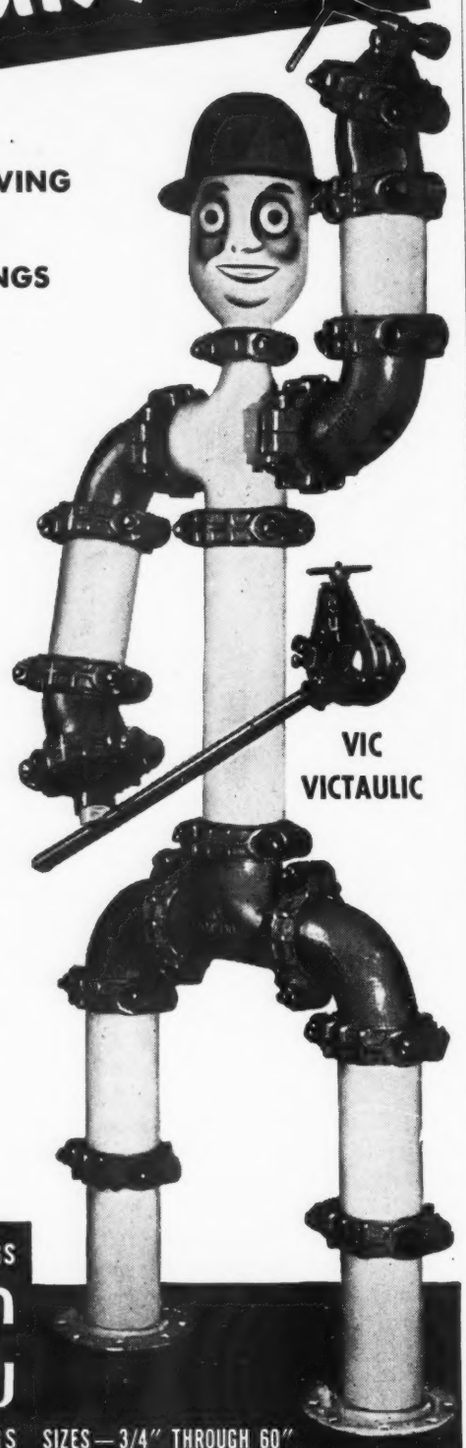

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and all research facilities elsewhere that may be useful. With advances already marked up in coal utilization, combustion and preparation, he declared, it is now time for the industry to turn its attention to new mining methods that will cut production costs. "The mining development program is going to be an intensive one. We have a very definite goal and we have the funds to employ the engineers and scientists necessary to concentrate all their energies on this one problem for the next two years."

The coal-burning gas-turbine locomotive is not just around the corner, warned C. K. Steins, mechanical engineer, the Pennsylvania R.R., who reported on the work of the Locomotive Development Committee, although four years of hard work already has been done and a great deal of progress has been made. Much still remains to be done, he declared, citing problems that have developed since last year's progress report by the committee.

Among these problems are: (1) space and horsepower required by a crusher large enough to crush sufficient quantities of coal to 90 percent minus 200-mesh; (2) an alternate method of crushing coal particles to minute size by hurling them against a highly erosion-resistant target; (3) transferring the particles resulting from primary crushing into a fast-moving stream of air (about 700 m. p.h.) to smash them against the target, maintaining at the same time the needed air-pressure differential between the pulverizing chamber and the combustion chamber; (4) design of an efficient and long-lasting combustor capable of handling a heat release of 1,500,000 B.t.u. per cubic foot per hour; (5) a number of other smaller but no less difficult problems such as warping, localized burnouts, encrustations and combustion-speed controls from idling up to full power; and finally (6) removal of coarse particles from the gas as it leaves the combustor—a puzzle which will have to be solved by some means other than the cyclone separators that at first were thought to be suitable.

How practicable is it to make oil from coal on a commercial scale? That was the question posed by Frank A. Howard, consulting engineer, New York. As a result of pioneering work in coal hydrogenation in Germany and England and the study and research carried on by American oil companies, the entire American oil industry now has a good understanding of the hydrogenation process and its possibilities, Mr. Howard declared. Likewise, the Fischer-Tropsch process of hydrocarbon synthesis, though not backed by such wide commercial use and experience as the hydrogenation process, also is well known in the United States.

Since the end of World War II, some of the same economic and military factors which led governments

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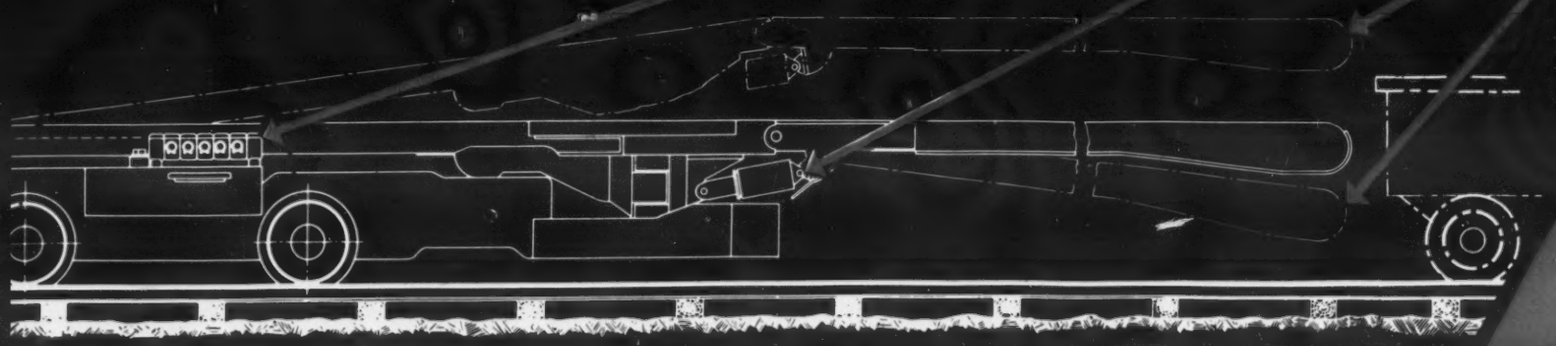

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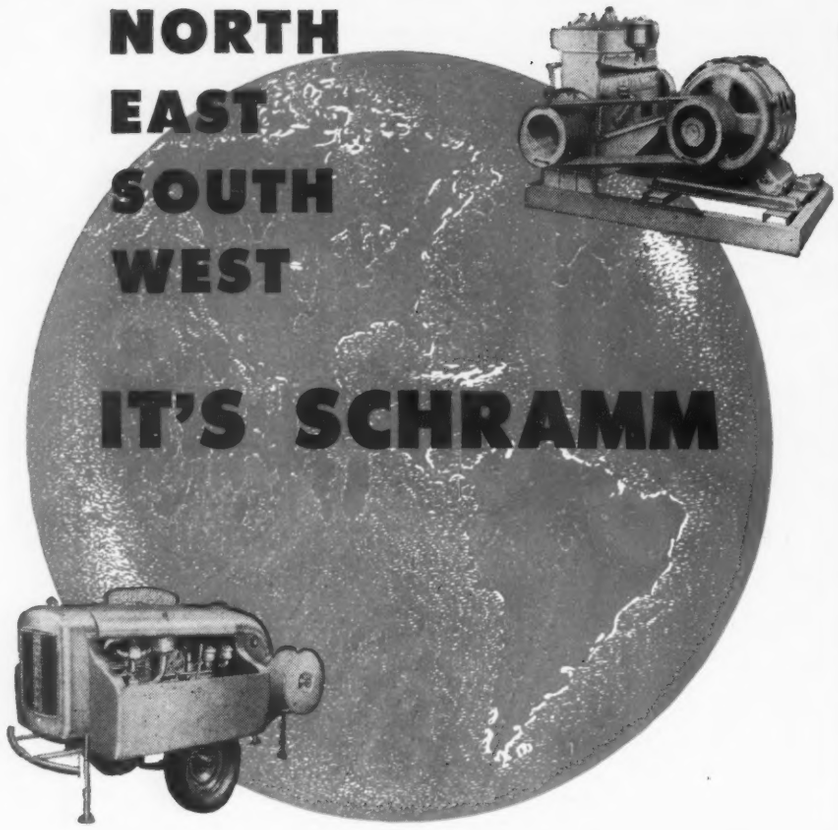

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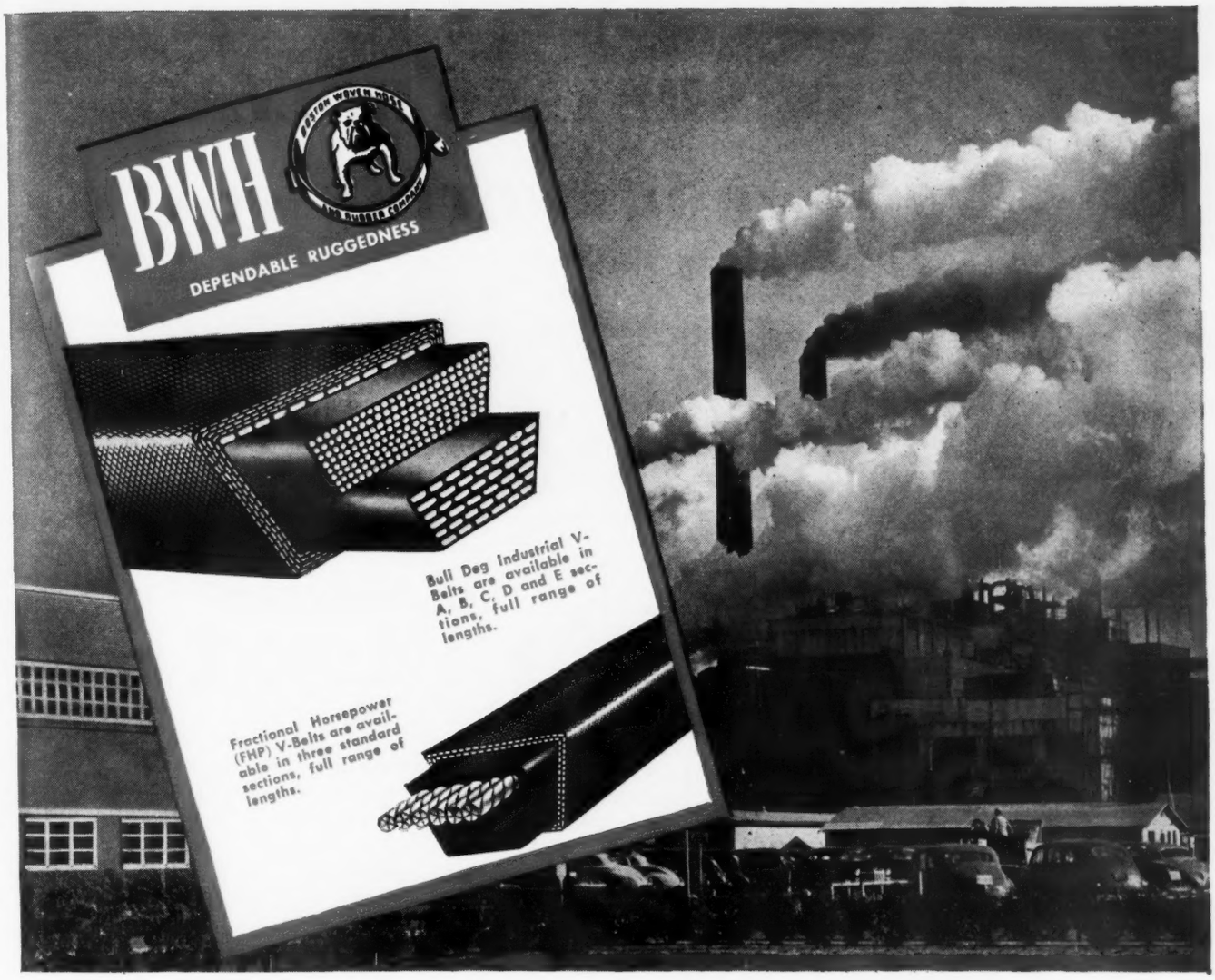
in Germany and England to support production of synthetic fuels have begun to be felt in the United States. Widespread spot shortages of crude oil and products, rapidly mounting oil demands, the threat to peace and the changeover of this country from a net exporter to a net importer of oil have brought the matter still further to the front. Indeed, Mr. Howard pointed out, if we limit production from known fields and future discoveries in accordance with present regulations to avoid undue waste of oil or gas and obtain maximum recoveries, our present deficiency of over 100,000 bbl. per day will climb steadily and within 15 years or less not only the United States but the Western Hemisphere as well will produce less crude oil than they consume.

These are the principal economic and military reasons for government support of a synthetic-fuels industry similar to pre-war German and English industries, Mr. Howard declared. "It would be a mistake to underestimate the force of these arguments," he warned, although oil supplies have improved recently and new discoveries in Canada have restored confidence in methods used to forecast new oil fields.

Spurred by these reasons favoring a synthetic-fuel industry, government activity and industrial research recently have increased, Mr. Howard said, citing stepped-up movements by the Industry Advisory Committee of the Bureau of Mines' Office of Synthetic Liquid Fuels, the Military Petroleum Advisory Committee, the National Bituminous Coal Council Committee on Synthetic Fuels and the American Petroleum Institute's Committee on Synthetic Fuel. In addition, he stated, to get more reliable data on the extent, quality and location of coal reserves useful for a synthetic-fuels industry, the Army engineers have contracted with Ford, Bacon & Davis, engineering consultants, for wide surveys. These activities, of course, are in addition to new synthesis laboratories being constructed by the Bureau of Mines and to pressure for more generous appropriations by Congress for synthetic-fuels investigations.

For maximum progress in the development of a synthetic industry, Mr. Howard suggested three lines of advance: (1) further technical development and pilot testing of modernized coal gasification; (2) preparation of complete and reliable project plans for large synthesis units at fixed favorable locations; and (3) collection of adequate field engineering and geological data on location, quality and mining conditions of coal and shale reserves suitable for conversion to liquid fuels. The foundation for a national synthetic-fuels industry must be laid by the government on a schedule that would allow one to two more years before freezing the designs of any large coal gasification plant, Mr. Howard argued. Meanwhile, he stated his belief that private industry would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prefer to explore modernized gasification on its own without government subsidy but would be willing to fit its own program into an over-all schedule proposed by the government.

Exports of solid fuels, excluding shipments to Canada, for the first eight months of this year totaled 16,508,000 net tons, a reduction of 14,539,000 net tons compared with the same period in 1947, according to Mr. Owen, reporting as president of the Coal Exporters' Association of the United States, Inc., The drop in exports to Europe is attributable to the austerity program of the Marshall-Plan countries, the complex international financial scene, disturbed political conditions in France, Italy and Germany and some restrictions imposed by regulations of the Economic Cooperation Administration. Likewise, increased exports from England, Bizonal Germany and Poland have depressed European markets for American coal.

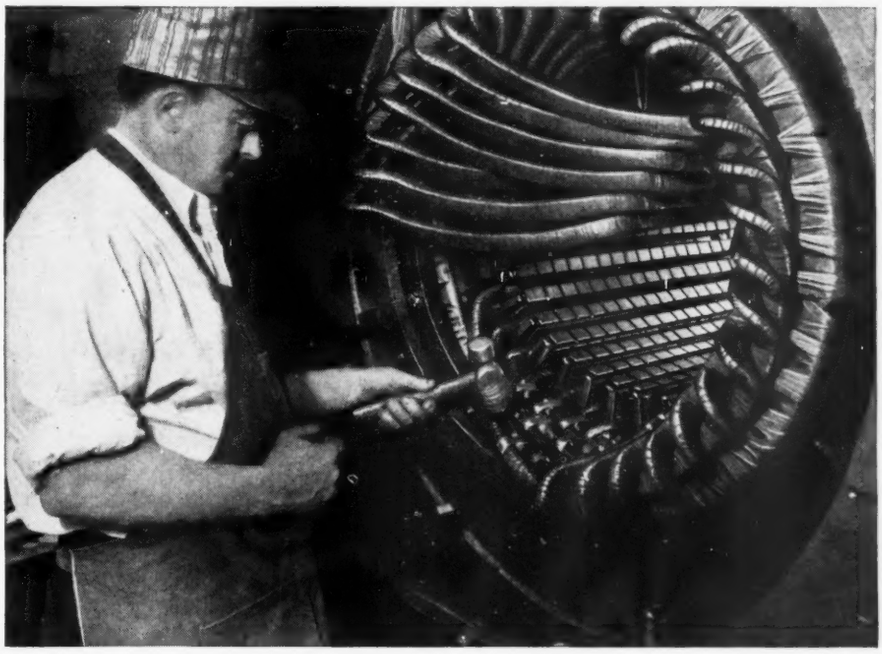
Use of American dollars to purchase Polish coal for Marshall-Plan countries seems hardly fair to American exporters and producers, Mr. Owen contended. Many of the exporters' problems have been eased by the association's conferences with government departments and agencies, but some problems still remain, such as the ECA requirement that no foreign-aid funds may be used for bulk purchases of any commodities at prices higher than the prevailing prices in the United States, adjusted for quality, transportation and terms of payment. To help American coals compete with European coals, Mr. Owen urged a direct government subsidy covering the differential between ocean freight rates for American vessels and those for vessels of foreign registry.

For the future, Mr. Owen predicted, the growing population of Europe plus the slow rate of industrial recovery probably will sustain a strong demand for American coals, assuring a profitable export market for some years ahead.

"The current outlook for coal is extremely bright, even to the extent of inviting over-optimism," declared George A. Lamb, economist, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa., the first speaker at the Wednesday morning session with Henry G. Schmidt, president, Powhatan Mining Co., Cleveland, Ohio, presiding.

Long-range optimism about coal's future is based on the need for wiser use of our fuel resources; a probable drop in residual-fuel output resulting from growing demands for gasoline, distillates and other oils; stricter channeling of natural gas for household, chemical and other special uses, with consequent withdrawal from steam-raising; and existing trends that include an expanding economy, a growing population and great strides in industrial and domestic mechanization. These trends add up

to help you beat motor heat!



When overwork and ambient heat keep motor temperatures up, burnouts can be a constant threat to operation. To prevent frequent motor overhaul, insist on Deltabeston* magnet wire for every winding job.

Deltabeston is built in types for all high-temperature conditions up to 200 C. Insulated with purified asbestos, Deltabeston magnet wires are flexible for easy winding—heat- and moisture-resistant for long service. Whether you do your own rewinding or send it to an outside shop, always specify Deltabeston to beat motor heat.

To help you select

Now, to help you select the proper magnet wires for your heat problem, an informative 20-page booklet—with handy selector chart—is ready for mailing. Just fill out the coupon for your free copy.

**Trade-mark Reg. U.S. Pat. Off.*

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Wires and Cables
built to
beat the heat

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Please send me the new, free booklet on Deltabeston magnet wires.

Name..... Title.....

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City..... Zone..... State.....

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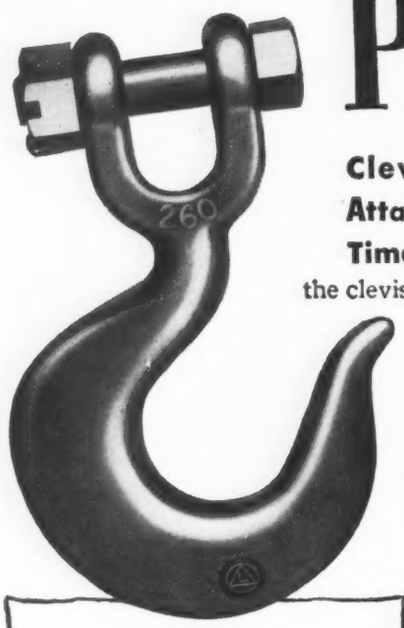

Clevis Hoist Hook Is Quickly Attached . . . Changed . . . Saves Time and Labor. Slip the bolt through the clevis, spin the nut, spread the cotter and this heat-treated hook's ready and safe for your toughest jobs. No welding, no spelter, no connecting fittings required. Send for Laughlin's famous data book of industrial fittings... Catalog No. 140.

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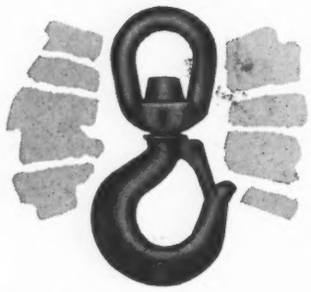

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Laughlin Replacement Swivel Hook Assembly with Safety Latch. Bolts on and off . . . no machining . . . no threading. For hoists, cranes, lashing operations. One-ton and half-ton sizes.

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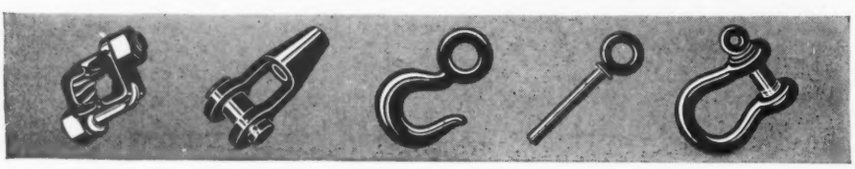
THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



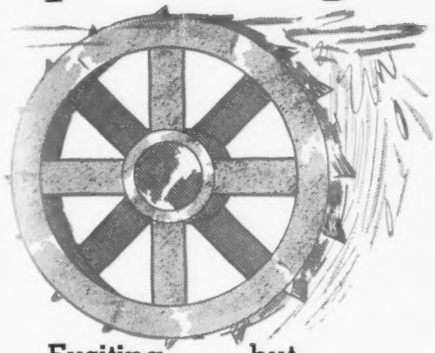
to a bituminous-coal market in the middle 60s about 80 million tons above the 1947 market, according to Mr. Lamb's prediction.

As for short-term prospects, our economy's advance to higher levels will not be over a smooth course, Mr. Lamb declared, pointing out that energy requirements will fluctuate with dips and spurts in business activity. Viewing the probable decline in the railroad market resulting from further dieselization, with a probable displacement of coal equal to 10 to 15 million tons per year for the next several years; the growth of the electric-power industry to a point where it will become the major commercial outlet for bituminous by 1949; an increase in steel capacity that probably will offset a decline in beehive coke output; the improved supply situation in fuel oil over last winter and expanded pipeline capacity for natural gas, which may cut retail bituminous consumption by about 4,000,000 tons in 1949; and a decline in general industrial and manufacturing needs, Mr. Lamb concluded that bituminous production in 1949 will total about 540,000,000 tons, as against some 580,000,000 tons in 1948. Principal declines will be as follows: railroads, from 102,000,000 to 91,000,000 tons; coke ovens and steel mills, from 117,000,000 to 114,000,000 tons; retail yards, from 90,000,000 to 86,000,000 tons; manufacturing and miscellaneous, from 125,000,000 to 110,000,000 tons; exports, from 47,000,000 to 35,000,000 tons. An increase, Mr. Lamb predicted, will be registered only in electric power utilities, from 99,000,000 to 104,000,000 tons.

The drop to 540,000,000 tons in 1949, Mr. Lamb contended, need not injure the sales prospects of established commercial companies who prepare their coal and ship it as a high-class product. On the contrary, by prudent operation the industry probably can realize a sales return that will cover mining costs and take care of investment. Additions to future mining capacity needed to meet demands for a high-quality product will require considerable time for development and large sums for capital investment. "The odds are in favor of a strong American bituminous industry during the years ahead. The industry knows its responsibilities and consumers, noting the fuel trend, appreciate the necessity of a healthy coal structure. Decisions flowing from this combination point to sound business principles," Mr. Lamb concluded.

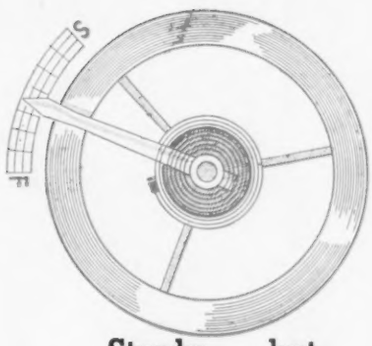
"In Coal Heating Service you now have a going concern, a property of growing value and suddenly of greatly increased importance for reasons with which all progressive shippers and retailers of coal are familiar," said B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co., Chicago, and chairman, N.C.A. Marketing Committee, who summed up activities of the cooperative marketing program launched at the Cleveland meet-

Speaking of Wheels . . .

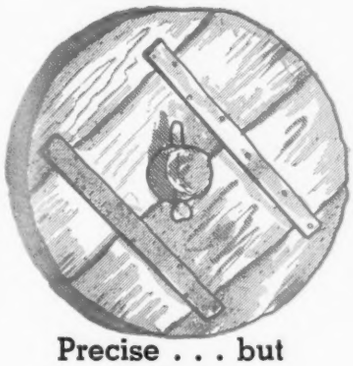


Exciting . . . but not dependable

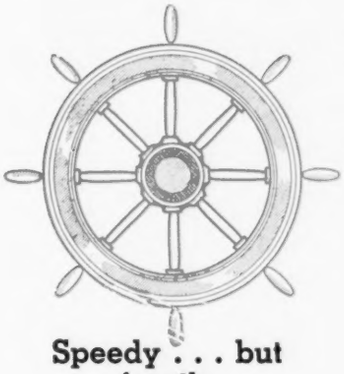
Dependable . . . if in the right hands



Sturdy . . . but ancient and slow



Precise . . . but delicate



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Always runs . . . if it rains

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will save you money. Give us the opportunity of explaining the advantages of the design and workmanship of the STERLING CAST STEEL wheel. Save power by using Sterling's balanced design wheels.

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PRECISE — STURDY DEPENDABLE and ENDURING

DUFF-NORTON *Quick Operating*

MINE ROOF JACKS

INSURE FULL CAPACITY WITH COMPLETE SAFETY

Sturdy **-YET ONE MAN CAN HANDLE THEM**

Duff-Norton Mine Roof Jacks are designed and constructed for safe, easy and quick operation. These dependable jacks serve as sturdy supports until permanent timbering is in place. Available in 8 and 16 ton capacities, with minimum and maximum heights ranging from 30″ to 89″. Write today for data.

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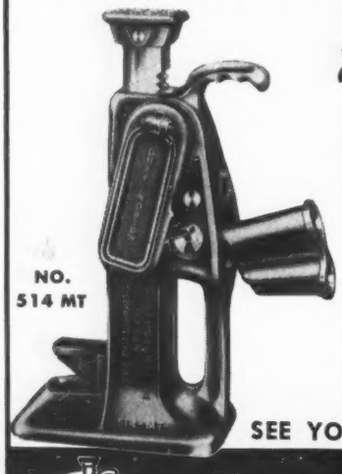

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JACKS···for fast rerailing of cars and other lifting jobs

This Duff-Norton 5-ton Automatic Lowering Jack speeds up rerailing of mine locomotives and cars, bracing cutting and loading machines, mine track maintenance and general shop repair work. Write for catalog and data on this and other dependable Duff-Norton Jacks for every lifting and lowering application.

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"The House that Jacks Built" · PITTSBURGH 30, PA.

THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS

ing of the association in March, 1946. Citing excerpts from widely scattered reports sent in by local units of Coal Heating Service, Mr. Gebhart stressed the better service now available to home users of coal and reported that there now are about 50 Coal Heating Service groups operating in communities in 21 states, with a membership of about 1,500 retailers who handle nearly 15,000,000 tons annually.

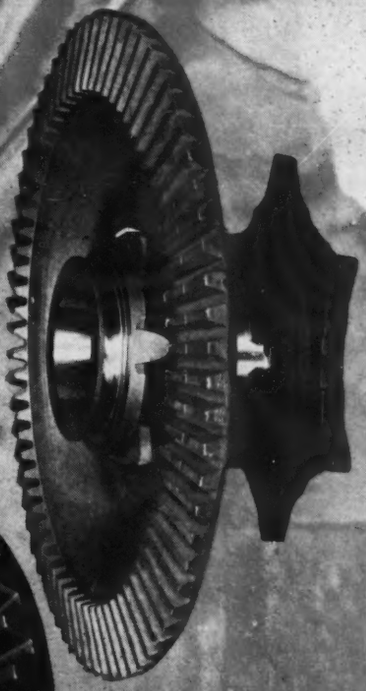
Coal Heating Service spends about $300,000 annually on advertising, more than half of which is contributed by retailers, Mr. Gebhart declared, adding that the public-relations dollars invested by producers and shippers in this enterprise thus are being doubled in effectiveness.

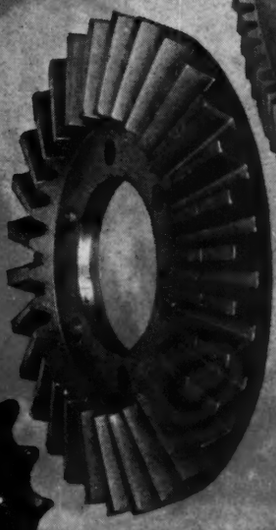
Having won heating-equipment manufacturers to coal's side, Coal Heating Service now plans to enlarge the activities of regional shipper committees, two of which already are organized, and thereby marshall shippers' sales forces behind the cooperative marketing plan, Mr. Gebhart reported. Expenditures for the year ahead, including approximately $500,000 from retailers, will exceed $1,000,000 for all purposes, he stated.

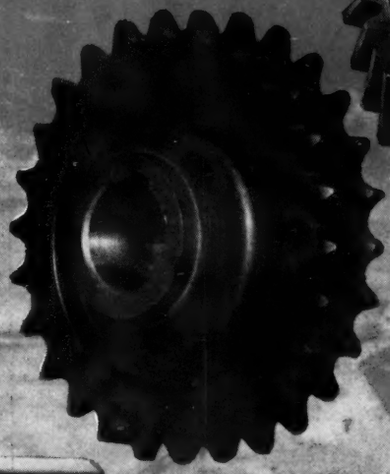
Pointing to a steady increase over the last few years in the number of college students in mining engineering, M. D. Cooper, manager of vocational training, N.C.A., warned that the coal industry is neglecting opportunities to employ trained engineers by failure to visit campuses personally to urge graduates to enter the coal industry, although there is a trend toward increasing the number of engineering scholarships offered by coal companies and operators' associations to attract more young men to the bituminous industry and improve labor relations. Mr. Cooper invited the attention of coal operators to the new N.C.A. "Directory of Educational Institutions Maintaining Departments of Mining Engineering" and urged that it be used by operators in finding promising graduates and by high-school teachers and students for selecting the right kind of college for mining engineering. Asking that mine officials show greater interest in their local high schools by making talks to students and examining textbooks in use, Mr. Cooper declared that a brighter future in the industry's educational area can be assured by building closer ties with colleges and schools through personal contacts and scholarships.

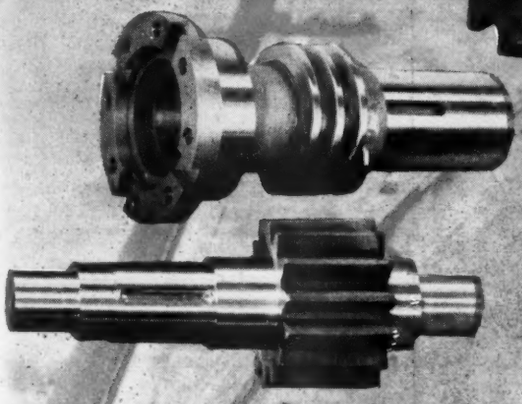
Although the coal miner is at the top rung of the industrial ladder in average weekly earnings, vacation pay, medical care, pensions and other benefits and although the industry has made great strides in technological advance and has spent hundreds of millions of dollars to improve its methods and its product, far too large a segment of the public still regards the industry as unprogressive and its workers as underpaid and underprivileged, warned Ralph C. Mulligan, director of public relations, Bitumi-

YOUR PROFITS ARE IN DIRECT PROPORTION TO THE NUMBER OF "TOOL STEEL" PROCESS PARTS USED





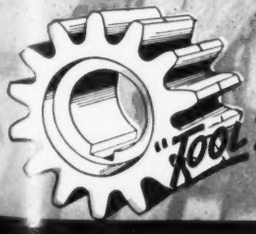




All "Tool Steel" parts are guaranteed to handle more coal than any other products used in the same service.

Their maintenance records show a superiority of trouble-free service that in many cases exceeds a ratio of 13 to 1.

These profit facts speak for themselves. Write today for complete information.



The Standard of Quality

for GEARS • PINIONS • SPROCKETS • WHEELS *and other* HARDENED PRODUCTS

THE TOOL STEEL GEAR & PINION CO.

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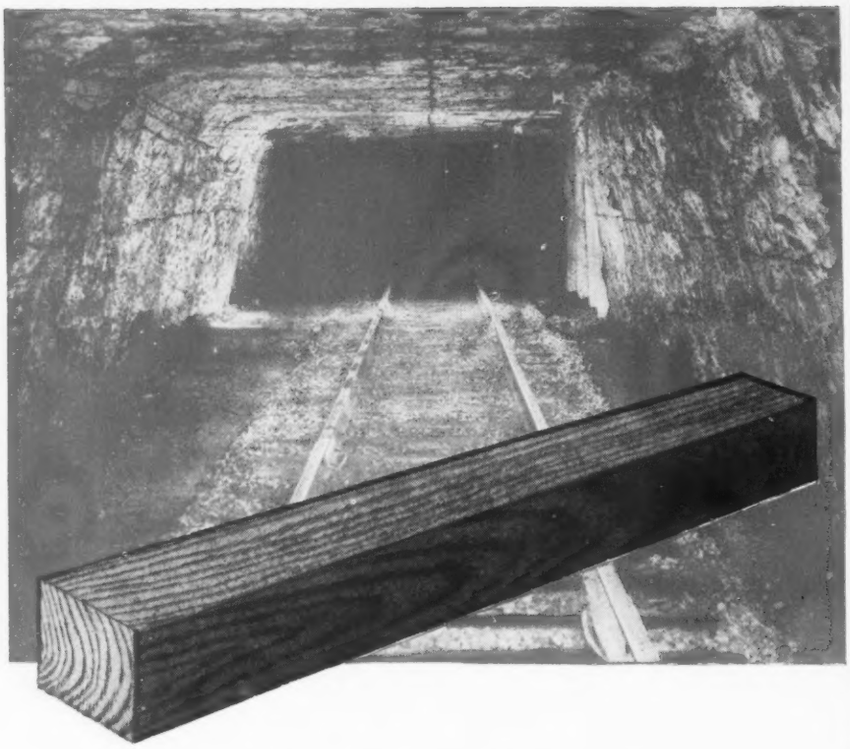


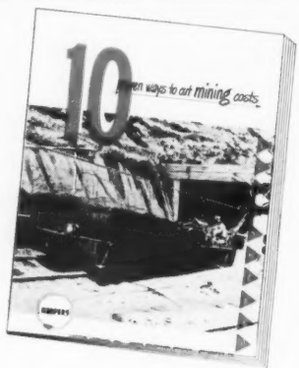
where ordinary ties last 4 years—

KOPPERS PRESSURE-CREOSOTED TIES LAST 5 TIMES AS LONG!

Here's a story of substantial savings! It's typical, *not* unusual. A certain coal mine found that ordinary, untreated ties averaged only four years' service. Then, Koppers Pressure-Creosoted Ties were installed. Twenty-one years later, over 97% of these ties were still in use, and were still giving good service.

In other words, by installing Koppers Pressure-Creosoted Ties—the Ties that resist decay and stand up under the punishment of heavy traffic—this mine eliminated *five costly replacements.* Such savings have always been important, but with today's high labor and replacement costs, they are now imperative.

Koppers Pressure-Treated Wood can save money for you. It's easy to find out how. Just send for our free book—"10 Proven Ways to Cut Mining Costs."



KOPPERS COMPANY, INC.
Pittsburgh 19, Pa.

KOPPERS PRESSURE-TREATED WOOD

nous Coal Institute, who was the first speaker at the Wednesday afternoon session. George F. Campbell, president, Old Ben Coal Corp., Chicago, presided.

Summarizing B.C.I. operations during the past year, Mr. Mulligan pointed to the growing confidence of editors and reporters in the institute's press information service, the increasing use of articles about coal by various magazines and newspapers, numerous requests for photographs from B.C.I.'s picture file, the recent publication of "Bituminous Coal Facts and Figures" by the research and statistical division, the continuing program of the educational department and the speakers' bureau, the launching of the radio program called "Congress Today," the growing gains from magazine advertising (which absorbs about half of B.C.I.'s annual budget) and the close liaison between B.C.I. and the several departments and affiliates of the N.C.A. These activities, Mr. Mulligan declared, are bringing real public-relations benefits to the industry.

Plans for the year ahead, Mr. Mulligan announced, include enlarged activity along present lines, release of a new one-reel motion-picture film entitled "Underground Adventure," new slide films for use in schools, increased attention to the public-relations aspects of wage negotiations and increased cooperation between B.C.I. and individual mining companies in local public-relations projects. Meanwhile, though progress has been gratifying, Mr. Mulligan warned that favorable publicity is never a complete cure for any of the industry's ills and that the coal industry needs rigorous self-examination and never-ceasing efforts to match with deeds its claims and promises.

Reporting on the activities of the educational department of B.C.I., Dr. M. Edmund Speare, director, listed highlights of the year as follows: growing distribution of the "Quiz Book," "Pertinent Facts," and other educational information in answer to teachers' requests at the rate of 1,000 to 2,000 or more each week; growth of the educational mailing list to nearly 50,000; participation by the educational department in exhibits at teacher, medical and industrial conventions; preparation of material for revised or new textbooks for 18 authors and publishers; wide circulation of "The Magic of Coal," a documentary film; preparation of six strip films for school use; distribution of a prepared women's club program entitled "America's Coal and World Security"; and delivery of 347 prepared speeches through members of the speakers' bureau, who carried coal's story into 26 states before civic clubs, women's groups and industrial gatherings.

"Successful public relations presupposes the elementary and simple idea that what people think is important—what they think of the product

Be Wise - SECTIONALIZE!

Your power cable **SECTIONALIZED** *in short lengths*—

- Reduces fire hazards.
- Eliminates bunching and coiling.
- Provides for minimum lengths in service.
- Insures better voltage to machines.
- Is easier to handle and maintain.
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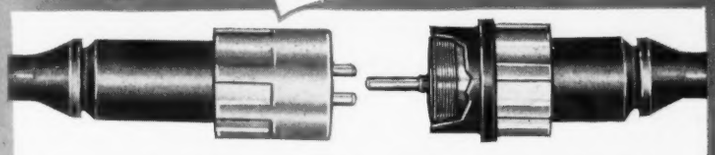
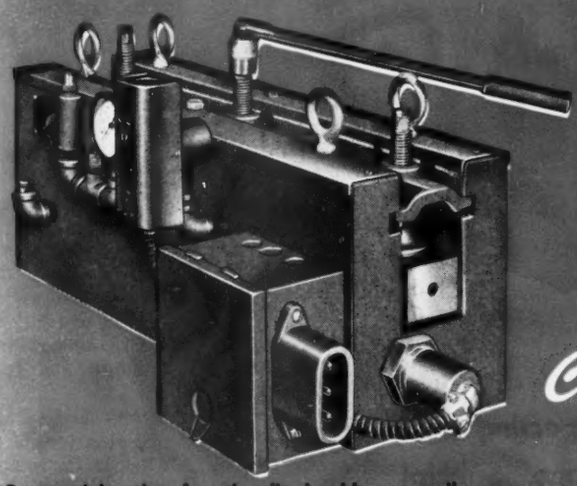


Mines permissable Type Coupling Connectors (when used with Mines Safety Circuit Center) save time, cost and cable. Make and break connections easily and *safely*. Note rubber sleeve for thread protection.



Damaged lengths of sectionalized cable are easily replaced with minimum loss of productive time . . . quickly put back into service with a Mines Cable Vulcanizer.

Consult a Joy Engineer

Contact your nearest Joy office for free copy illustrated Connector price list No. 105, Vulcanizer bulletin No. RV-106 and No. SCC 100 on Safety Circuit Centers.

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The Parmanco Single Speed Transmission Drill is designed to meet the requirements of the general prospecting field where it is not necessary to drill in solid limestone. Special sliding frame permits drilling and pulling of augers without moving drill. New design of chuck eliminates all hand operation in raising power plant. Recommended for 50 to 60 feet with four and one-half inch equipment. Under favorable conditions it is being used to greater depths.

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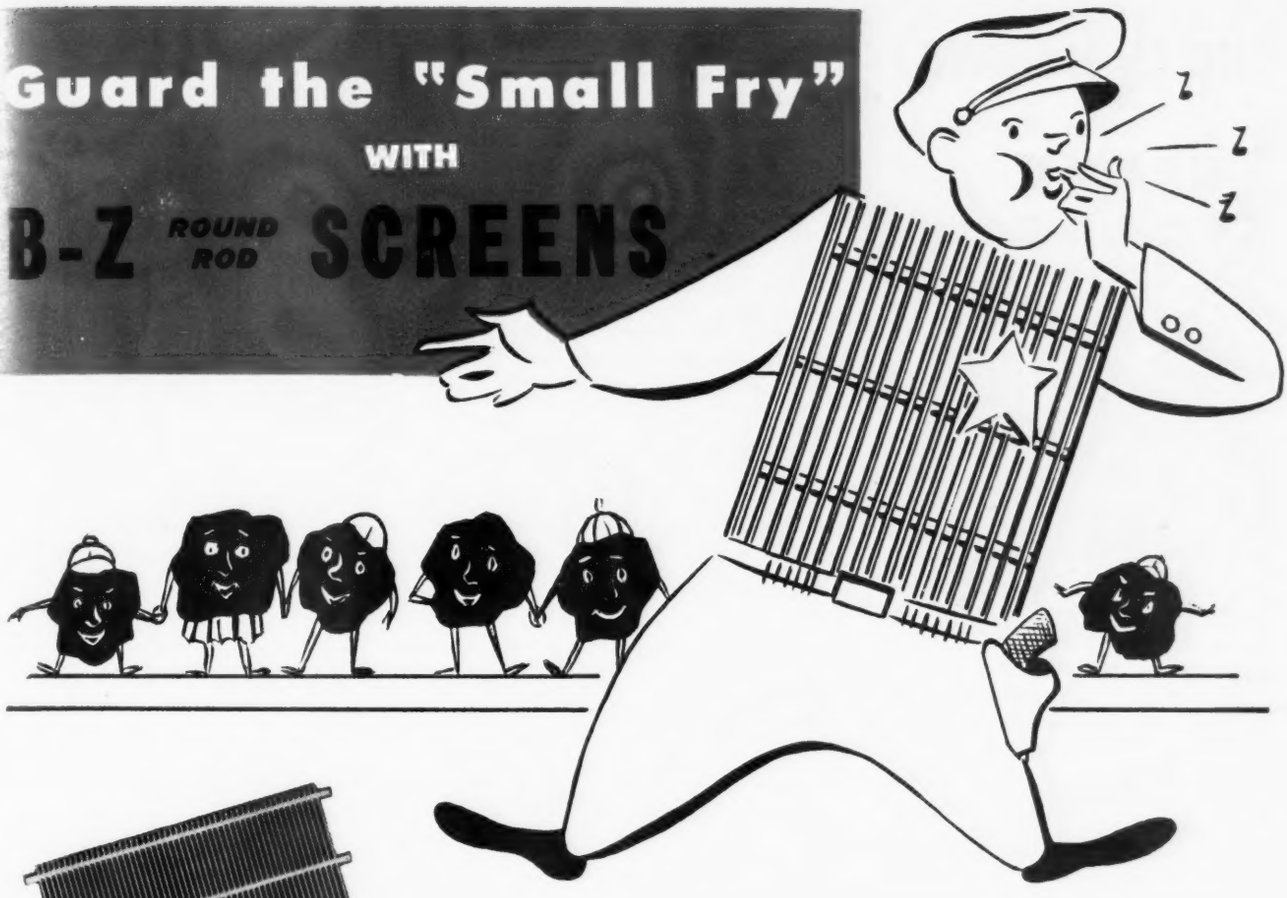
or service, what they think of those who run the business, what they think of the policies and practices of management," said T. J. Ross, public relations consultant, New York. Mr. Ross cited four elements of good public relations for industry as follows: (1) a point of view that recognizes the importance of industry's attitude of mind and seeks to make its policies and practices accord with enlightened public opinion; (2) a conviction that public relations is an active function of management, involving the practical decisions of everyday business and the creation of policies which, if sincerely practiced and made known to the public, will be reflected in good will; (3) sound techniques in presenting the industry's story through all forms of publicity and publicity media, authoritatively and openly sponsored; and (4) full use of those who work as public-relations officers or counsel and who advise on moves that may affect public opinion, assist in understanding public attitudes and reactions, and pass information along to the public in such a way as to gain confidence and good will.

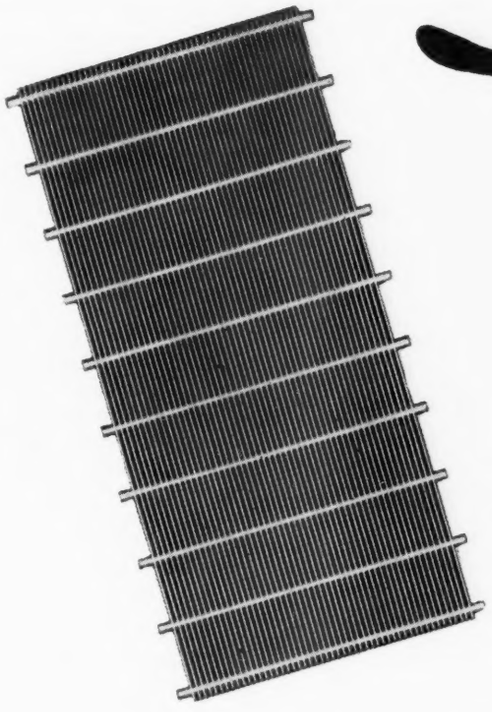
The public passes judgment on an industry in terms of the product's quality and price, the way the industry treats its workers, evidence of technological progress and the public-spirited attitude of the industry's leaders, Mr. Ross contended. Along these lines, he pointed out, B.C.I. has attempted to bring more light to bear on miners' wages and working conditions, their living conditions, the industry's technological and safety improvements and the industry's research in utilization of coal. A recent measurement of the program's effectiveness shows that B.C.I.'s educational work, its publicity and its advertising were intelligently conceived but that, because of earlier years of inaction on the part of the coal industry, much remains to be done.

Public appraisal of the operators apparently is formed mostly during periods of wage negotiations, when the operators too often are put in the position of seeming to be against the things that the people are for, he pointed out.

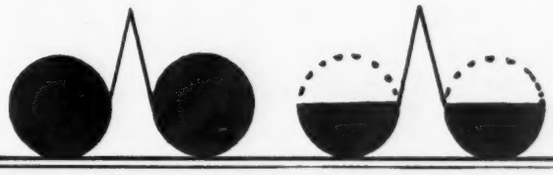
Although much has been done to improve coal's public relations in other areas, the big job lies in its industrial relations, Mr. Ross declared. To strengthen coal's position in the public mind, Mr. Ross suggested the following: (1) enlarged institutional research, involving a re-examination and re-appraisal of policies and attitudes with which the industry approaches its annual wage negotiations, improvement of the mechanics of negotiations, and achievement of more forceful and effective spokesmanship; (2) bringing forward into public view progressive men in the industry who, because of timidity, industry traditions or committee machinery, have failed to speak up and advance constructive ideas and programs of their own; and (3) continuation and in-

Guard the "Small Fry" WITH B-Z ROUND ROD SCREENS





B-Z Round-Rod Screens keep a close guard on the small coal in your processing operations. Welded construction of stainless steel alloy . . . full length openings . . . round-rod design maintains constant openings as screen wears. You can have any shape, size, dimension or mounting of B-Z Screens engineered to fit your plant needs.



Screen openings do not increase — even with 50% wear

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LUBRIPLATE Lubricants are a paradox. They not only possess enormous film strength to withstand the heaviest loads but they function with minimum drag, hence conserve power. The "stay-put" quality of these unique lubricants means less frequent application and less lubricant consumption. Yes, they are most economical too. Write for particulars.

LUBRIPLATE

Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

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DEALERS FROM COAST TO COAST

CONSULT YOUR CLASSIFIED TELEPHONE BOOK

tensification of the industry's advertising, educational and publicity programs.

Leading off a discussion of the industry's public relations following Mr. Ross' address, Fred S. McConnell, president, Enos Coal Mining Co., Cleveland, stressed the vital need for better public relations, the progress made thus far in spite of vast difficulties and the industry's basic soundness as a foundation for building better public opinion. "In these changing times, coal does not dare leave in the public mind the opinion it now has of the industry," Mr. McConnell warned.

Mr. McConnell's remarks were followed by others from the floor, the discussion being shared by George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago; D. A. Thomas, president, Boothton Coal Co., Boothton, Ala.; R. H. Sherwood, president, Central Indiana Coal Co., Indianapolis, Ind.; R. L. Ireland, president, Hanna Coal Co., Cleveland; J. D. Francis, president, Island Creek Coal Co., Huntington, W. Va.; B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co.; and M. L. Patton, vice president, Truax-Traer Coal Co., Cincinnati. In these comments, stress was laid on progress thus far in reconstructing public relations for the industry; the problems ahead; the need for an agency that would publicize the industry's point of view during wage negotiations; the need for a broad, solid base of information about safety, mechanical progress, labor relations and the miners' wage position and living conditions; and the value of B.C.I.'s speakers' bureau as a strong instrument for building favorable public opinion.

Efforts of the Land Use Committee of N.C.A. to protect the soil and put stripped land to best use were summarized by R. L. Ireland, chairman of the committee, who pointed out that stripped lands can be made to supply timber for deep mining and other purposes, and can be converted into recreational areas or grazing lands. In the near future, he stated, the committee expects to survey similar land uses sponsored by other surface-mining industries.

Following Mr. Ireland, L. E. Sawyer, temporary chairman, Land Use Advisory Committee, declared that scientific planning is the best way of determining how such lands should be employed—whether pasture, orchards, grazing or recreation. Declaring that most mined-over lands can be put to profitable use—even better, in many cases, than before they were mined—Mr. Sawyer pointed out that out of a total of 189,872 stripped acres in nine middle western states, less than 5 percent contains enough toxic material to forbid revegetation. Of the remaining acreage, he said, 55,794 acres now support stands of weeds, grasses, shrubs and legumes and 52,355 acres support natural and

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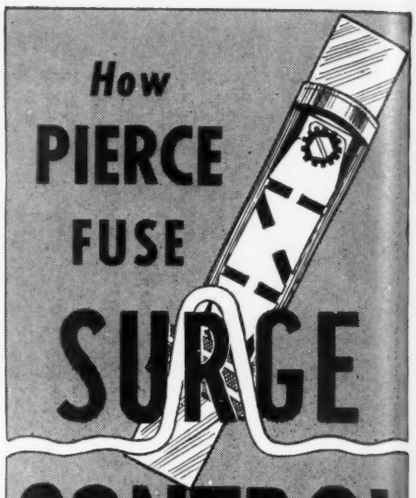

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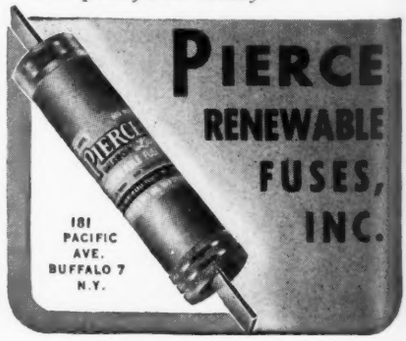

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From these 10 permissibles you can select the right explosive for any coal blasting requirement. The booklet, "Hercules Explosives," will assist you in confirming your choice of the correct permissible.

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COAL POWDER 2

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For Producing Coarse Coal

COLLIER* C
RED H B

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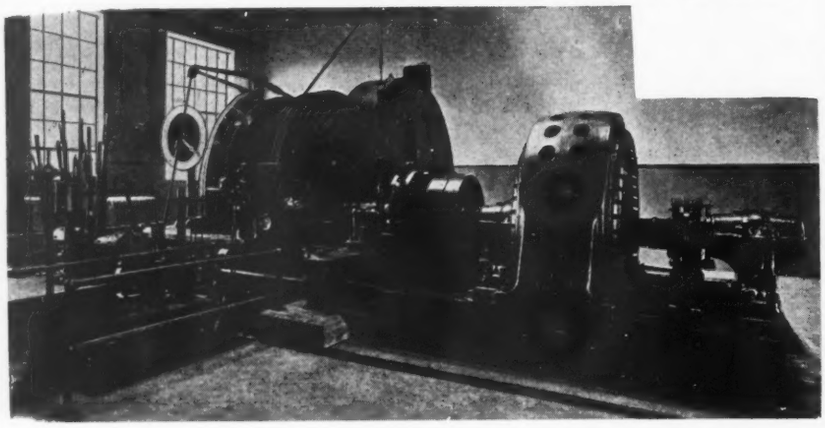

We have no line of so-called "standard" hoists, but have been building steam and electric shaft and slope hoists for half of a century. Each design is based upon a first-hand study of all the factors, right on the ground.

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Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears.. Sturdy. Few parts . . . ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

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planted forests that are flourishing.

Activities of the recently established Safety Division of N.C.A. were reviewed by L. C. Campbell, vice president, Eastern Gas & Fuel Associates, Pittsburgh, and chairman, Safety Committee, N.C.A., who reported that the division's director has visited operators in most producing areas, assisted at two disasters, presented papers at safety meetings, addressed accident-prevention classes, prepared newspaper articles, assisted in drawing up modifications in the explosives code, conferred with officials of the U. S. Bureau of Mines on various matters and prepared and distributed safety posters for use at bituminous coal mines.

Future plans of the division, according to Mr. Campbell, include closer liaison among state mining departments, the U. S. Bureau of Mines and the industry, formation of additional safety conference groups and heavier stress on the need for personal participation by top management in safety work.

How activities of the bituminous industry are coordinated with those of other industries having similar interests relative to the extension of natural gas facilities was related by Mr. Owen in his capacity as vice president, Fuels Research Council, Inc., an organization representing the bituminous and anthracite industries, merchant coke plants and bituminous and anthracite carriers.

Efforts of the council are directed at informing the public and proper government agencies along these lines, Mr. Owen stated: (1) the importance of coal to the national economy and the harmful effects of depleting reserves of scarce fuels; (2) the unsoundness of extending natural-gas pipelines to new areas at the expense of areas now dependent on natural gas; (3) the need for restricting sales of natural gas for inferior purposes and dumping; and (4) seeking the support of other organizations for these and other purposes. However, Mr. Owen concluded, though agencies like the Fuels Research Council are active in behalf of the bituminous industry, the use of natural gas is reduced, in the final analysis, by the sale of coal. "It is up to the individual coal producer to make these sales," he declared.

In addition to appraising the association's achievements and problems, N.C.A. members at the meeting recorded their approval of the Bituminous Coal Advisory Committee's request for 31,200 tons of steel monthly for maintenance and repair of facilities and directed that their approval be communicated to the Steel Industry Advisory Committee and the Office of Industry Cooperation. Earlier, N.C.A. President Gaines announced action by the board of directors and the several committees to maintain association dues at their present level.

The Coal Exporters' Association of the U. S., meeting on Oct. 7, adopted

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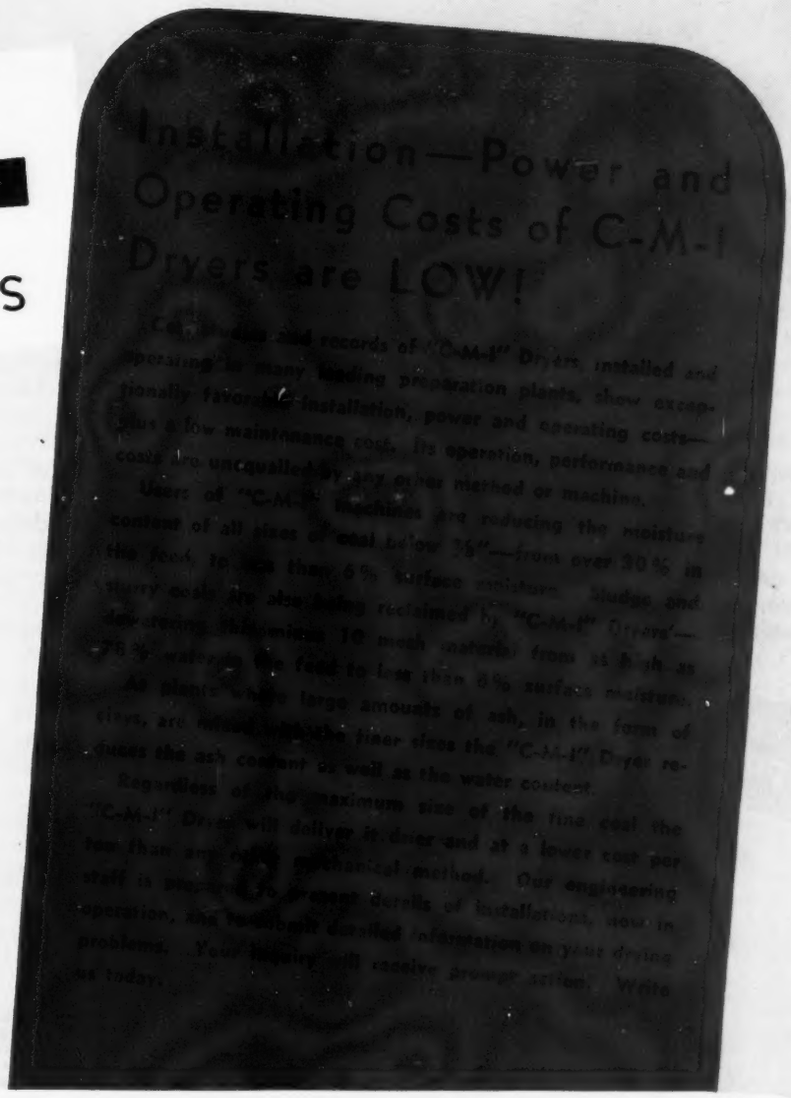

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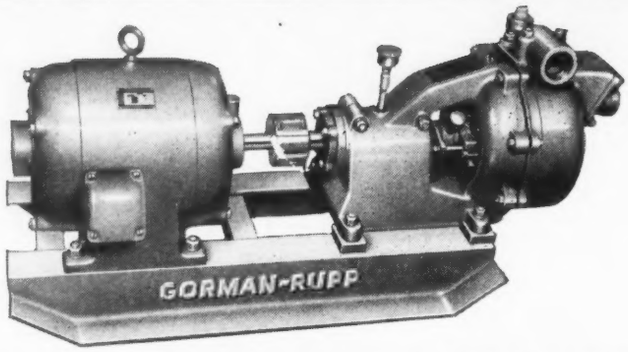


GORMAN-RUPP PUMPS DESIGNED FOR VARIABLE WORKING HEADS

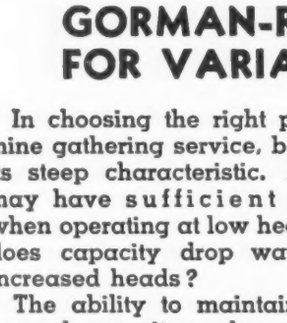
In choosing the right pump for mine gathering service, be sure of its steep characteristic. A pump may have sufficient capacity when operating at low heads. But, does capacity drop way off at increased heads?

The ability to maintain nearly normal capacity under any working head is especially important in portable units. That's why you can put a Gorman-Rupp anywhere – on any kind of job. Frictional loss and increased lifts do not greatly affect its efficiency. Hence, smaller capacity pumps can often be used where heavy duty, more expensive units would otherwise be required.

This is just one of many advantages. Gorman-Rupp mine gathering pumps require unbelievably low headroom. They operate continuously, automatically -- day after day -- without attention. They provide positive, powerful self-priming without adjustments. Their extreme simplicity of design results in non-clogging, trouble-free service in the toughest duty.

Available in capacities from 50 to 200 GPM and heads up to 125 feet.

Ask for special mine bulletin No. 301-46.



Here's your answer. It's the Gorman-Rupp all bronze MINE SPRAY PUMP. Tool kit size - weighs only 27 lbs. - ready for instant use anywhere needed. Fitted for ¾" pipe or common garden hose. Lifts up to 25 feet -- delivers 8 GPM at 40 pounds pressure. Maximum capacity 16 GPM — Maximum pressure 50 lbs. Completely self-priming -- electric motor driven.

Write for bulletin 7-ME-11.

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resolutions calling for clarification of Section 202 of the Economic Cooperation Act to fix the liabilities of coal exporters, modification of the rules of the Office of International Trade in the light of the current supply situation, inclusion of the cessor clause in the Maritime Commission's WARSHIPVOY regulations and direct subsidy of American shipping interests to the extent of the differential in freight rates now existing between vessels of American and foreign registry. In addition, the exporters heard Charles A. Owen, retiring president, predict a continuing strong European market for American coals. J. S. Routh, president, Routh Coal Corp., was elected president of the association succeeding Mr. Owen. "Class A" directors were elected as follows: Mr. Routh; A. L. Lynn, assistant to the president, Island Creek Coal Co.; S. P. Hutchinson Jr., general sales manager, General Coal Co.; E. K. Downey, New York district manager, Red Jacket Coal Sales Co.; and Mr. Owen.

•

Compensation Sought For Vacation Period

The Pennsylvania State Superior Court heard arguments Oct. 5 and reserved decision on an action by John A. Mattey, a miner employed by the Glen Alden Coal Co., to obtain state unemployment compensation for the 10-day vacation period last July called for by the union contract. Mr. Mattey had gone to work at Glen Alden's Nottingham colliery last April 18 and, since he was not eligible for the vacation pay under the contract, applied for the unemployment compensation.

The decision in Mr. Mattey's favor made by Stanley J. Davis, unemployment compensation referee, who ruled that he was available for work and not unemployed through any fault or act of his own, was reversed by the state board of review. The board said that the suspension of work was actually a voluntary act on Mr. Mattey's part since the vacation was granted at the request of the union on behalf of its members, of which he was one.

•

Student Competition Set By Anthracite A.I.M.E.

The establishment of a competition for prizes for the best papers on anthracite submitted by undergraduates of any of the three technical colleges closest to the region, Lafayette College, Lehigh University and Penn State College, by the Anthracite Section of the A.I.M.E. was recently announced by Floyd S. Sanders, secretary of the section. First and second prizes to be awarded will be $50 and $25, respectively, and the section may enter the winning paper in the Na-

PIPE

now Available

Carlon E Flexible Synthetic PIPE for Low Pressure Mine Operation

Two girls easily lift one 200 ft. coil of Carlon E Pipe weighing only 100 lbs. Easy to handle and install.

After years of research and exhaustive tests Carter has developed a new flexible synthetic pipe—acid resistant, flexible, light in weight and economical—which completely meets the requirements of low pressure mine operation for pressure, suction or sprinkler applications.

Sizeable installations have been made in mines of leading coal companies and actual use has proved the durability and dependability of Carlon E and satisfactorily demonstrates its many superior advantages.

PHYSICAL PROPERTIES—Severe tests prove that Carlon E Pipe is *completely impervious to acid reaction* and it can be safely claimed to have a projected corrosion-free life of at least 20 years. Carlon E Pipe retains its flexibility and toughness at all temperatures ranging from 50° below zero to 100° F.

LABOR SAVING—Ease of installation and handling is a special feature of Carlon E which saves time and labor. In the first place it is extremely light in weight. A 200 ft. section of 2″ pipe weighs only 100 pounds—⅛ the weight of steel pipe of comparable length and diameter. Its flexibility facilitates handling as it adjusts itself to varying heights of the floor and can be readily extended around corners without use of ells or tees. This feature, as well as the fact that it only requires one coupling to each 200 ft. section, greatly increases ease and speed of installation. In a test under heavy muck conditions two men installed 600 ft. of Carlon E complete with pump in 2 hours. To install steel pipe under the same conditions would have required 3 men over 6 hours.

PRICE—The price of Carlon E installed is comparable with steel at normal price. At present inflated steel prices Carlon E is decidedly cheaper.

AVAILABILITY—Carlon E pipe is in production and can be shipped within 2 weeks from receipt of order. Furnished in ½″, ¾″, 1″, 2″, 3″ coiled, 4″ and 6″ in straight length. Carter corrosion-free couplings are available. Other standard types of couplings can be used such as King, Dresser and Victaulic.

Write for quantity prices and further information.

SPECIAL TRIAL OFFER

Carlon E is furnished in 200 ft. coils for easy handling. To enable you to make a practical trial and thorough test of this new synthetic pipe in your mine we will furnish one coil (200 ft.) of the 2″ size at the 2000 ft. quantity price of 35c per foot, or $70.00 on the condition that if it does not prove entirely satisfactory it can be returned for full credit. *Order today.*

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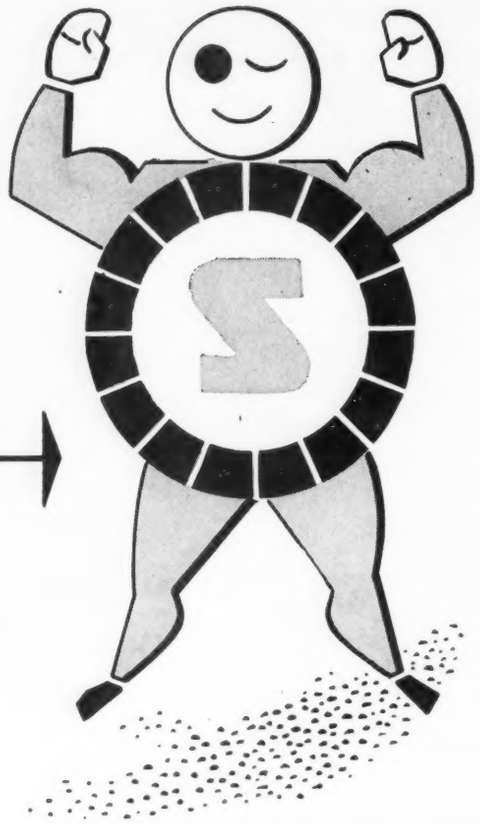

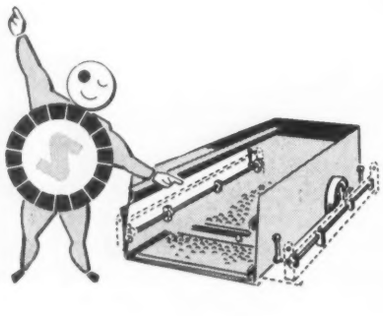

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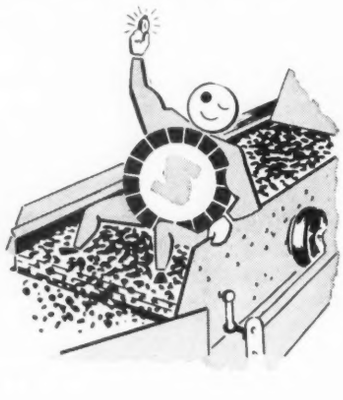
Whether your screening of coal is in connection with mining or stripping operations, you'll benefit by Seco's smooth, trouble-free performance. Seco's patented Equalizer Assembly (in outline) controls the action of the screen body with resultant true circular action under all load conditions.



THIS IS WHY YOU CAN SCREEN MORE TONS PER HOUR WITH A SECO

The smooth action of a Seco keeps the coal moving, reduces blinding and plugging of the meshes and by so doing—increases tonnages. Thousands of enthusiastic Seco users coast to coast have proven this. There's a right Seco for your screening job, too!

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TRUE CIRCULAR MOTION VIBRATING SCREENS

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tional Student Prize competition conducted by the A.I.M.E., which awards a first prize of $100.

Those eligible to compete include any undergraduate student associate of the institute or any undergraduate member of an affiliated student society in good standing. The topic of the paper is to be chosen by its author but must deal with some phase of the anthracite industry, either mining, preparation, marketing or research. The papers must be in the hands of the committee by May 1. They may be presented by the author at a meeting of the anthracite section if the committee considers them of sufficient interest.

•

B. & O. to Rebuild 2,000 Coal Cars

In an effort to increase its supply of coal hopper cars, the Baltimore & Ohio R.R. last month was to begin rebuilding 2,000 of them in its own shops. The cars are to be turned out at an estimated rate of 100 a month. By rebuilding the cars, the railroad will be able to further augment its car supply and do it faster than any other way, R. B. White, B. & O. president, said. During the past seven years, 14,025 50-ton hopper cars and 4,500 70-ton hopper cars have been ordered by the company and all but 698 scheduled for delivery in October have been put in use, according to the company's statement.

•

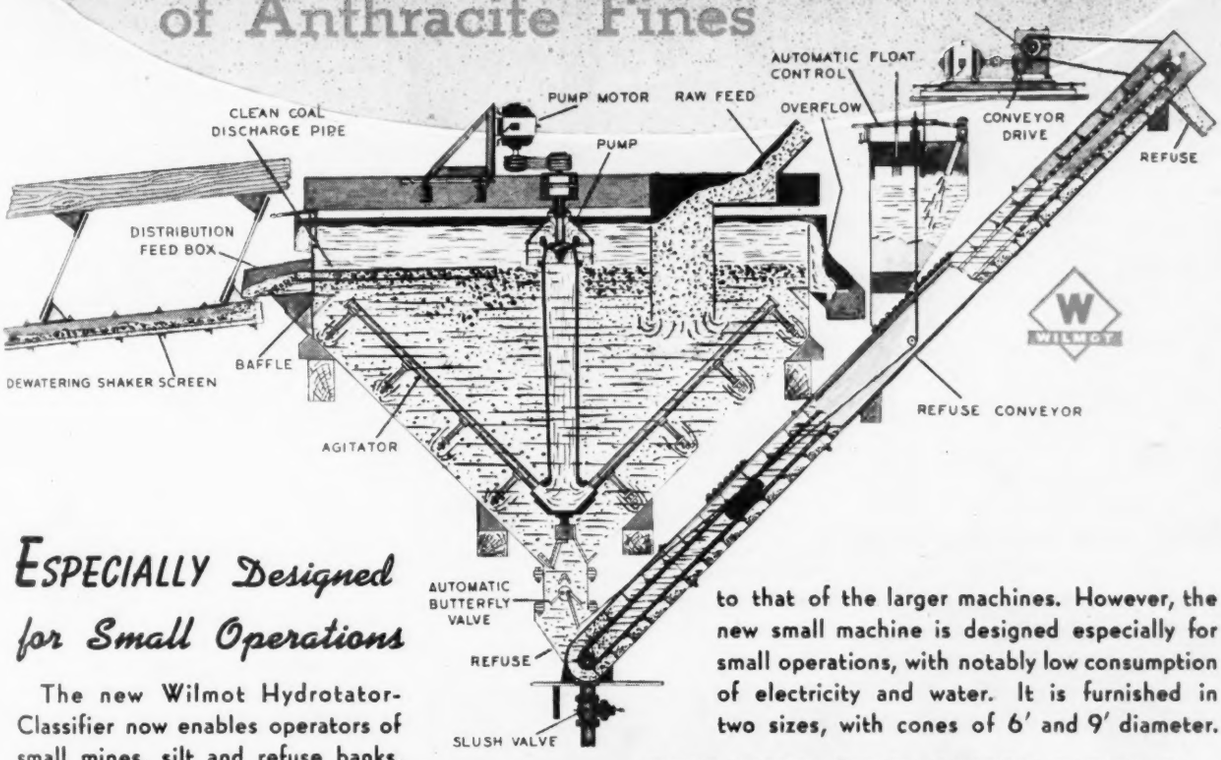
Foreign Developments

GREAT BRITAIN—An emergency program to step up lagging coal production in Britain was being planned last month following a meeting Oct. 7 of representatives of the mine union and the National Coal Board. Since last spring weekly coal production has rarely topped the 4,000,000-ton minimum needed to maintain domestic supplies and export commitments, it was pointed out.

As a result of the meeting, a joint committee of the two groups was set up to study the possibilities of cutting down absenteeism, improving production methods and the output of face miners and increasing tonnages from extra shifts now voluntarily worked by the miners. Unless output is improved it will be necessary to take 2,500,000 tons from reserve stocks to provide export shipments at

Announcement TO SMALL OPERATIONS

NEW HYDROTATOR-CLASSIFIER PROVIDES AUTOMATIC PREPARATION of Anthracite Fines



Especially Designed for Small Operations

The new Wilmot Hydrotator-Classifier now enables operators of small mines, silt and refuse banks, rivermen and others to mechanically produce the carefully sized and pure fines which are in increasing demand. With these new fully automatic machines, small operations are equipped to prepare No. 5 and No. 6 sizes of anthracite with the efficiency, economy and controlled quality of a big colliery.

The new small-size Wilmot Hydrotator-Classifier, like the standard sizes which are installed in many breakers, is a complete operating unit. Its engineering is similar to that of the larger machines. However, the new small machine is designed especially for small operations, with notably low consumption of electricity and water. It is furnished in two sizes, with cones of 6′ and 9′ diameter.

GET THE PREMIUM PRICE PAID FOR PURE FINES

The small-size Hydrotators, recently introduced by Wilmot, are preparing quality coal in prepared and steam sizes for many low-tonnage plants. Addition of the small Hydrotator-Classifier now makes it possible for such plants to recover the highly profitable fines, No. 5 and No. 6. Let us furnish details.

WILMOT ENGINEERING CO.

HAZLETON, PA.
Plant:
WHITE HAVEN, PA.

Wilmot Coal Preparation Equipment: Hydrotators • Hydrotator-Classifiers • Hydro-Separators • Simplex Jigs Crushing Rolls • Sizing Shakers • Bucket Elevators • Conveyors • Car Hauls • Keystone Rivetless Chain, etc.

WILMOT BUILDS BETTER BREAKERS

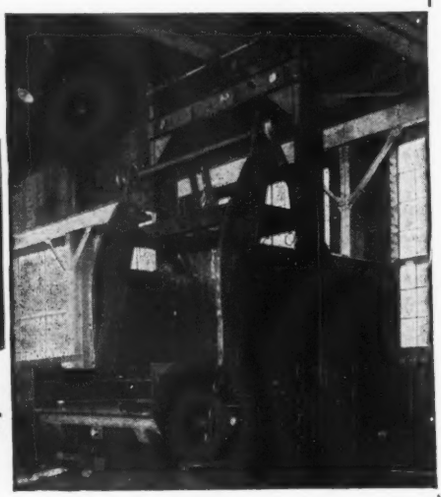
WHETHER IT'S A SLEEK AUTO OR A HOLMES CAGE IT TAKES GOOD DESIGNING!

In HOLMES design all operating mechanisms have been simplified as far as possible, both to eliminate dead weight and reduce the percentage of delay from failure of some gadget to function properly. All operating parts are arranged for quick change with ordinary tools.

SELF DUMPING

The car lock requires no special attachments on cars. It is also adapted for use with any of the standard automatic cagers.

PLATFORM CAGE



Over Turning Type Cage for Use with Solid End Cars

ROBT. HOLMES & BROS., INC.

DANVILLE, ILLINOIS

the rate of 16,000,000 tons annually planned for this year, it was reported. Coal exports for next year have been set at 23,000,000 tons, and to meet this goal the country must produce 12,000,000 tons above the over-all total of 211,000,000 tons originally scheduled for 1948.

FRANCE—A crippling strike of the French coal industry instigated by the Communist-dominated miners' union began Oct. 4, with 300,000 miners idle and a daily loss of 150,000 tons of coal. While all miners were not in favor of the strike, preliminary reports indicated that it was generally effective throughout the country, with strikes in other industries adding to the chaotic situation. According to reports, the mine strike was begun primarily for the purpose of nullifying the recent economic and fiscal program put into effect by the government so that France could obtain special Marshall Plan Aid.

CZECHOSLOVAKIA — Geological investigations have reportedly disclosed a deposit of coal of "extremely good quality" in the neighborhood of Modry Kamen, near Lucenec in Slovakia. The bed is estimated to cover an area of 96½ square miles. To date, 45 test borings have been made and sinking of shafts is being planned. Before actual mining of the coal can begin, however, the Lucenec-Modry Kamen railway line into the area must be completed.

The Brown Coal Mines & Briquette Works National Corp., of Sokolov, is reportedly building a new mine with an estimated yearly output of 3,000,000 tons near Tisov. The installation is expected to include an electric power station, drying works and gas, briquet and carbonization works so that part of the coal can be utilized on the spot immediately. The project is being developed under the five-year plan which begins in January, 1949.

AUSTRALIA—Members of the New South Wales coal miners' union have voted by a substantial majority to work "back" (alternate) Saturdays for the rest of 1948, with pay at time-and-a-half. The question was put up to the miners because of the necessity of building up stocks for the three-weeks Christmas-New Year holiday.

The National Convention of the Miners' Federation of Australia has passed a resolution opposing the policy of seeking to meet Australia's mounting demand for coal by the "widespread and haphazard" development of open-cut mines, stating that open cuts should be developed only as a part of a balanced plan without threatening the underground industry. The federation also requests that open-cut workings be shut down as soon as the coal supply has caught up with the demand. The federation demands that all cavities be filled in and leveled off after a strip mine has been exhausted. While underground pro-

New KENNAMETAL Catalog describes the world's largest line of cemented carbide mining tools

learn how these amazingly durable tools help to . . .

1. Reduce tooling costs
2. Drill and cut faster
3. Cut power consumption
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Kennametal Tools cut 10% to 30% faster, reduce drilling time by 20% to 70%, require 30% to 50% less power and . . . lower bit costs as much as 70%! They stay on the job far longer than ordinary bits with the result that men and machines do a better job, and get more places prepared in less time.

The reason for their outstanding performance is the *durable cutting edge of Kennametal,* the cemented carbide that has compressive strength 2 to 3 times greater than steel, is far harder than steel, and withstands shock, abrasion and wear far better than any other tool metal.

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Mining Machine Bits for every Conventional Chain

Drill Bits for drilling blast holes in shale, clay, and coal

Rock Bits for drilling blast holes in hard material

Solid Head Bits for drilling underground or overburden

FOR EXPLORATORY DRILLING

DRAG BITS

CORE BITS

That's how P&H Hartop hard-surfacing electrodes drive down repair costs

At $35.50, you make quite a saving. You not only get a new driving sprocket — you get one that's better than new. Why? Because the sprocket has been built up with P&H Hartop Brown. You see, this P&H Hard-surfacing electrode gives you a protective coating that Rockwells 40 on the C scale. It has other advantages, too — it resists both angular shock and abrasion.

Hartop is a series of 4 different types of hard-surfacing electrodes. They are very easy to use and you can hard-surface most anything with them. Here are the details:

HARTOP BROWN — Rockwell C-40 — for angular shock and abrasion.

HARTOP GREEN — Rockwell C-50 — for general all-purpose hard-surfacing.

HARTOP RED — Rockwell C-55 — to resist severe impact and extreme abrasion.

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The Hartop electrode series saves money by cutting down time and maintenance expense. You owe it to yourself to have a supply on hand. Order today from your P&H distributor or write direct to us.

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duction has increased only 20 percent since 1939, strip output, mostly lignite and other low-rank coal, has more than doubled.

The federation also has blocked by a resolution the proposed mass entry of European immigrants into the Australian coal industry. The government had been planning to admit several thousand displaced Poles and Balts to alleviate the manpower shortage. The drift of miners into the manufacturing industries has depleted the ranks of the younger miners.

The ban was explained by the federation on both political and safety motives. "The Poles and Balts are Fascist," it said, and "miners who don't know English may cause accidents." However, it is reported that the true motive is the desire to compel sufficient improvement in working conditions to make the mines more attractive for Australians.

ARGENTINA—A Polish commercial mission which has arrived in Argentina has stated that Poland can now supply Argentina with all the coal it needs. Argentina imports virtually all the coal it uses, about 3,000,000 tons a year. It currently expects to get about 1,000,000 tons from England this year and the remainder from the United States and other countries.

The head of the Polish mission, Dr. Stanislaw Gall, said that so far this year Polish coal production had reached 70,000,000 tons, of which 25,000,000 tons had been set aside for export. Any Polish trade would not involve dollars but would be in local currency, with Argentina presumably furnishing grain and hides in return.

Meanwhile, Argentina has been pushing a government-supported project to mine low-grade coal fields in Rio Turbo in southern Argentina.

•

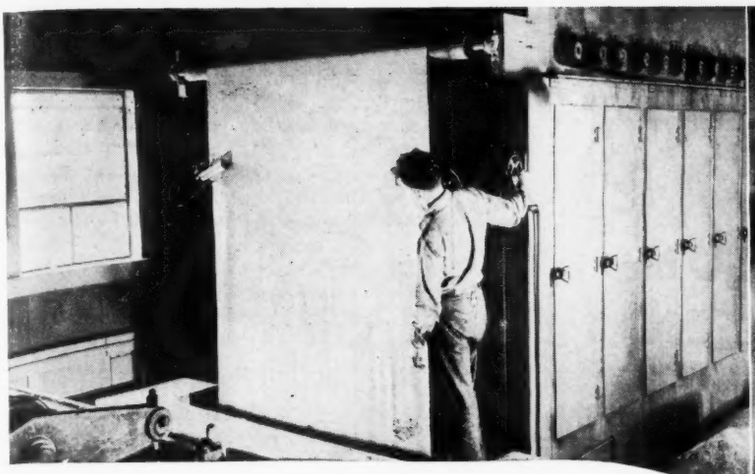
Mines Bureau Reports On Recent Explosions

An ignition of methane by a damaged flame safety lamp was the probable cause of an explosion July 30 in the Edgewater mine, T.C., I.&R.R. Co., Edgewater, Ala., that killed 11 men, according to the report of the investigation by the U. S. Bureau of Mines.

The gas accumulated in the mine when a new escapeway slope opening was cut through to the underground workings, the investigators reported. This interrupted the ventilation by creating a short circuit of the air current in the 11 South slope entries—the explosion area. This section had not produced any coal since February, 1948, and was considered temporarily abandoned.

Generally effective rock dusting confined the explosion to the abandoned area and nearby entries and prevented it from spreading throughout the entire mine, it was said.

In making the report, the Bureau's



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Not merely dry—it's DRY PROOFED under ELECTRONIC CONTROL

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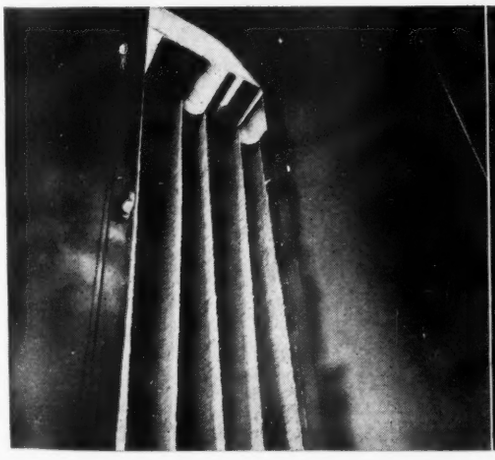

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Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

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RAIL

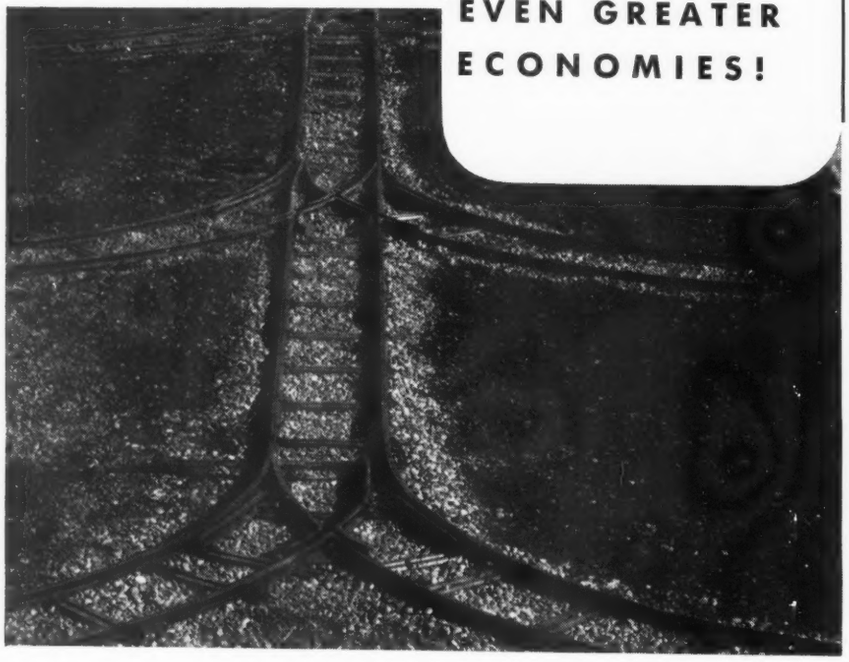
TRANSPORTATION HAS ALWAYS BEEN

ECONOMICAL

TRANSPORTATION . . . *Now*

Here is a partial view of a West Virginia Prefabricated surface installation. Underground track is supplied in this same "prebuilt" fashion.

WEST VIRGINIA PREFABRICATED TRACK OFFERS EVEN GREATER ECONOMIES!



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•

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Rail haulage, always good, both for efficiency and for economy, is now an even better choice because you can buy track for an entire system prefabricated and ready to lay. The number of separate pieces is small and all parts are interchangeable. As the work advances, the track may be covered and relayed with surprisingly low labor costs—results—fast economical transportation.

Without obligation, let our engineers show you the savings modern Prefabricated Track can make for you.

investigators offered the following recommendations: (1) doors should be installed in any new opening affecting ventilation in a mine and should be kept closed when a connection has been made; (2) temporarily abandoned workings should be examined by certified officials for methane and other hazards before workmen are permitted to enter.

An explosion Aug. 14 about 10 minutes after the main ventilating fan had been temporarily halted at No. 5 mine of the Georges Creek Coal Co., Lonaconing, Md., was attributed to the ignition of methane in an unworked section of the mine by the investigators of the U. S. Bureau of Mines, according to the Bureau's report. Three mine officials who were preparing to rock-dust while the mine was idle were killed.

Evidence indicated that an electric arc from an open-type locomotive caused the ignition of the gas, it was said, but the possibility of smoking or lighting a match was not ruled out by the examiners as a package of cigarettes was found near one body and an unlighted cigarette of the same brand was found in the room where the explosion occurred. The ventilating fan, normally operating 24 hours a day, had been stopped by the mine foreman and a mechanic to make measurement for a drive-belt guard. Rock-dust applications were thought to be the primary factor in preventing spread of the explosion, which was localized and confined to a new section of the mine.

Recommendations for preventing mine explosions included in the report were: (1) the mine should be operated in full compliance with the provisions as outlined in the Federal Mine Safety Code for gassy mines; (2) crosscuts should be made for ventilation purposes between rooms, entries and other places at intervals not exceeding 105 ft.; (3) tests for methane should be made before electrical equipment is taken inby the last open crosscut; (4) the practice of smoking or taking smokers' articles into the mine should be discontinued; (5) the fan should be operated at all times when men are in the mine; (6) the mine should be examined for methane and other hazards before men, other than the examiner, are permitted to enter.

•

Preparation Facilities

Lo ust Coal Co., Shenandoah, Pa.—Contract closed with Wilmot Engineering Co. for one 7-ft.-diameter Hydrotator to prepare No. 4 coal, feed capacity, 70 t.p.h.; and one 16-ft.-diameter classifier for buckwheat No. 5 coal, feed capacity, 65 t.p.h.

Lohb Coal Co., Schuylkill Haven, Pa.—Contract closed with Wilmot En-

"Job-Rated" TO FIT THE JOB

Trucks that *fit your job* . . . save you money. They save in many ways.

They save on gas, oil, and tires. They save on upkeep and repairs. They stay on the job. They last longer.

For such a truck, see your Dodge dealer. Tell him what you haul . . . the weight of your load . . . and your operating conditions.

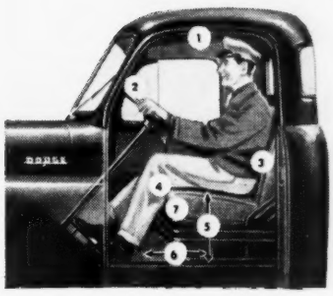
He will then recommend a Dodge "*Job-Rated*" truck that has been engineered and built to fit *your* job.

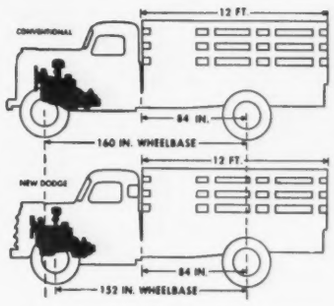
Your new truck will have "*Job-Rated*" power, for performance with economy.

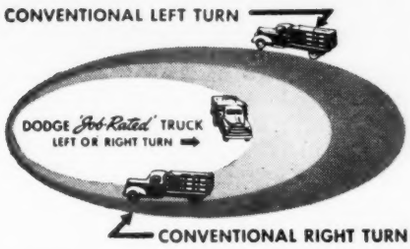
Every other unit . . . clutch, transmission, brakes, rear axle, springs and tires will be "*Job-Rated*" for long life and dependable operation.

For the location of the Dodge dealer in your community, consult the yellow pages of your telephone book.

PLUS... these important NEW features







SHORTER TURNING DIAMETERS

New Dodge "*Job-Rated*" trucks provide an entirely new ease of steering and handling. You can turn in much smaller circles, right and left, because of a new type of "cross-steering," plus shorter wheelbases and wider tread front axles.

MORE COMFORT AND SAFETY

1. Plenty of headroom. **2.** Steering wheel, right where you want it! **3.** Natural back support, adjustable for maximum comfort. **4.** Proper leg support. **5.** Chair-height seats. **6.** 7-inch seat adjustment, with convenient hand control. **7.** "Air-O-Ride" cushions, adjustable to weight of driver and road conditions.

BETTER WEIGHT DISTRIBUTION

New Dodge "*Job-Rated*" trucks have *much* better weight distribution. You can haul *more payload*. This has been achieved by moving the front axle back, *under* the frame, and moving the engine forward. More of the load is carried on the front axle. Wheelbases are shorter . . . but cab-to-rear-axle dimensions are unchanged.

DODGE "Job-Rated" TRUCKS

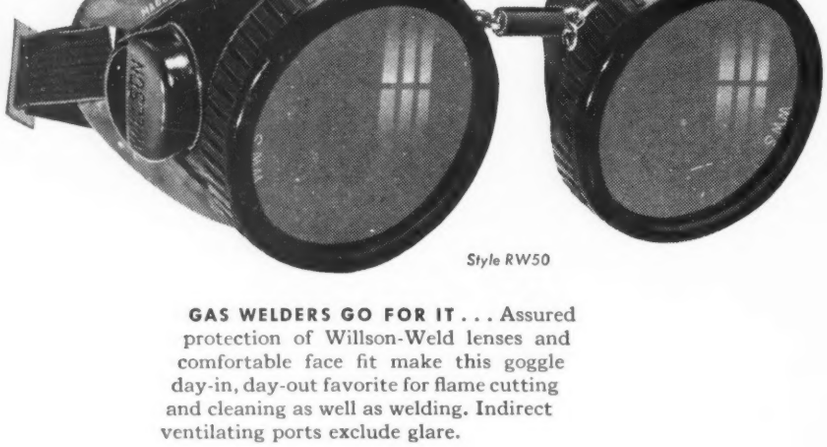
FIT THE JOB . . . LAST LONGER !

Visit the Big Dodge "Job-Rated" Truck and Equipment Show, Madison Square Garden, New York City, November 18-21, 1948

In the Glare of the Torch— think of **WILLSON**

Style CW60

ROOM WANTED FOR SPECTACLES? . . . There's comfort for wearers of prescription glasses in Willson Cover-Alls.* And the adjustable leather bridge rests lightly on the nose without pressure. Willson-Weld* lenses in the shade you specify, of course.



Style RW50

GAS WELDERS GO FOR IT . . . Assured protection of Willson-Weld lenses and comfortable face fit make this goggle day-in, day-out favorite for flame cutting and cleaning as well as welding. Indirect ventilating ports exclude glare.

Style DC50

FOR EYES THAT LEAD A DOUBLE LIFE . . . From welding to chipping with a flip of the wrist! Willson-Weld lenses in separate frames flip up to leave eyes protected by clear, Super-Tough* lenses.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

*Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE **WILLSON**

PRODUCTS INCORPORATED

Established 1870

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gineering Co., for two 3½-ft. diameter Hydrotators to prepare rice and barley coal; total feed capacity, 55 t.p.h.

Capone Coal Co., Avoca, Pa.—Contract closed with Wilmot Engineering Co. for one 2½-ft.-diameter Hydrotator to prepare barley coal; feed capacity, 18 t.p.h.

Buck Run Coal Co., Buck Run, Pa.—Contract closed with Wilmot Engineering Co. for one 12-ft.-diameter classifier to prepare No. 5 coal; feed capacity, 40 t.p.h.

Snap Creek Coal Co., Rich Creek mine, Wilber, W. Va.—Contract closed with Fairmont Machinery Co. for addition to present screening and conveying plant of Chance Cone washing plant to clean 5x¼-in. at 200 t.p.h.

Oxford Coal Co., Pittston, Pa.—Contract closed with Deister Concentrator Co. for two Concenco classifiers.

Swatara Coal Co., Minersville, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck coal-washing table.

Little Barry Coal Co., Madisonville, Ky.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck coal-washing tables to clean stoker coal.

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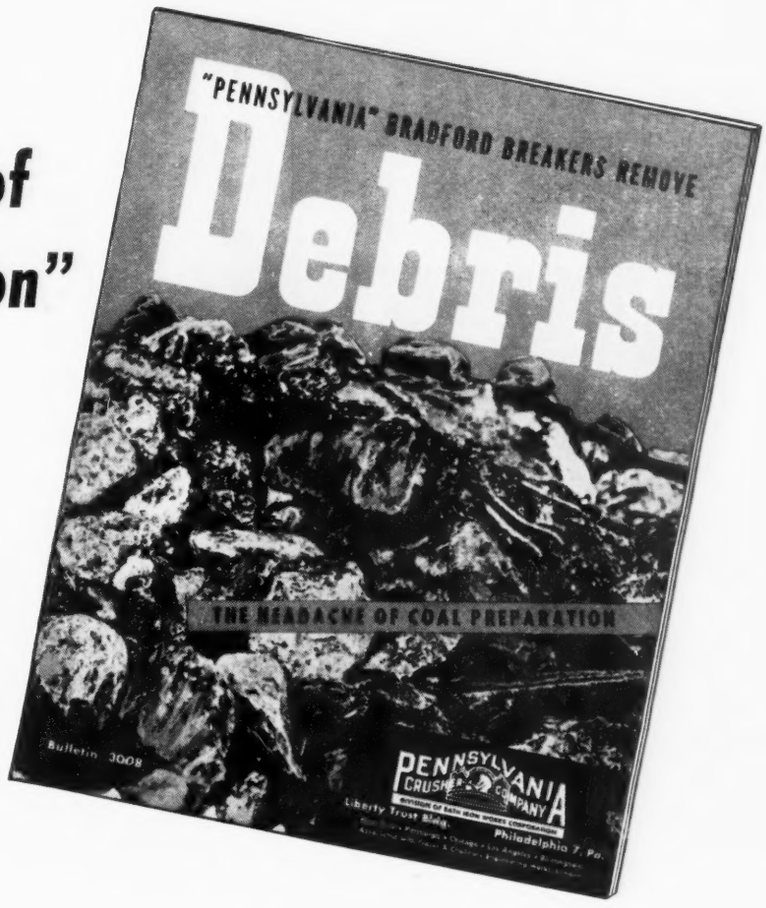
Coal Publications

Review of Bureau of Mines Work on Use of Diesel Engines Underground, by Martin A. Elliott. U. S. Bureau of Mines, R.I. 4381. 28 pp. plus 19 pp. of tables and photos. 8x10½-in.; paper; mimeo. Free. Use of diesels underground sets up three possible hazards; (1) health hazards deriving from exhaust gases; (2) explosion hazards presented by intake and exhaust openings of the engine; and (3) fire hazards connected with handling diesel fuel underground. The following conditions are necessary for safe operation: (1) ventilation to dilute and remove harmful and objectionable elements from engine exhaust; (2) flame-protective devices for intake and exhaust systems; and (3) adequate safety precautions in handling fuel. The Bureau has issued a schedule for testing diesel underground locomotives for permissibility.

Ignition of Firedamp by Explosives, by Bernard Lewis and Guenther von Elbe. U. S. Bureau of Mines, R.I. 4382. 11 pp. plus 3 pp. of illustrations. 8x10½-in.; paper; mimeo. Free. Discussion of the role of compression, heat conduction and diffusion in ignition of firedamp by explosives. The theory is advanced that an ignition hazard is created by pockets in the zone of contact in which firedamp is surrounded on several sides by detonation products.

"PENNSYLVANIA" STEELBUILT

How to Cure "The Headache of Coal Preparation"



- **Crush ROM Coals *Economically***
- **Remove Debris *Automatically***
- **Eliminate Oversize *Completely***

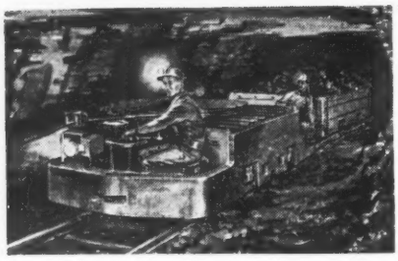
In conditioning ROM the scavenging of large refuse and the recovery of coal clinging to high ash impurities are equally as important as efficient crushing.

The "Pennsylvania" Bradford Breaker automatically scavenges hard refuse . . . removes and discharges mine timbers, tramp iron, blasting wire, sulphur balls, slate and rock . . . all debris larger than the Bradford screen perforations.

Bradford conditioned coals run uniform. With a given coal, the product will screen to approximately the same percentages day after day. Thus cleaning plant loads can be maintained with little variation. *Bradford preparation of coals substantially reduces the load of refuse that must be handled by cleaning plants and protects equipment from damage by large mine debris.*

Write for new Bulletin No. 3008 and further information on "Pennsylvania" Bradfords for use at coal mines and mine cleaning plants.

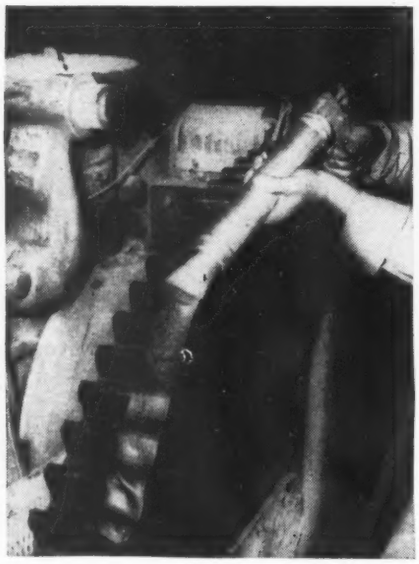
PENNSYLVANIA CRUSHER COMPANY
DIVISION OF BATH IRON WORKS CORPORATION
Liberty Trust Bldg. Philadelphia 7, Pa.
New York • Pittsburgh • Chicago • Los Angeles • Birmingham
Associated with Fraser & Chalmers Engineering Works, London



Equipment News

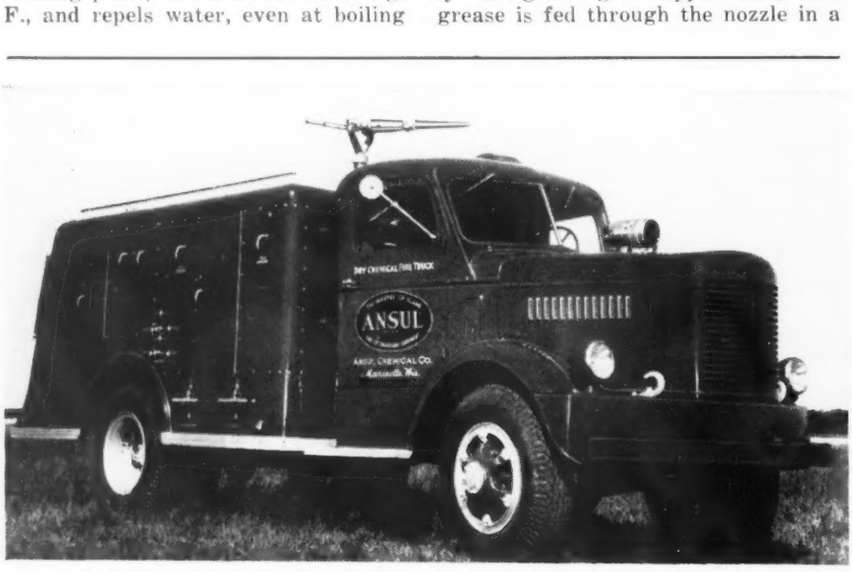
More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

NEW HEAVY LUBRICANT for open gears under extreme service conditions and a new method of application



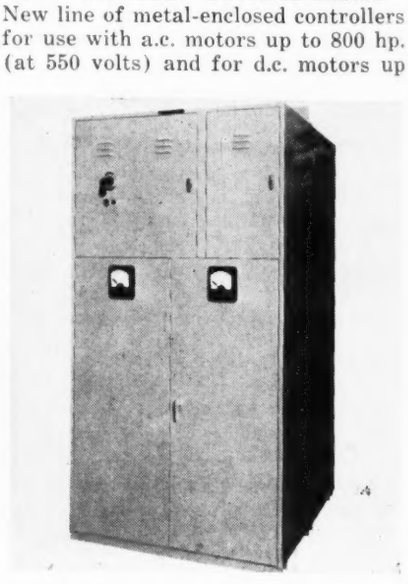
has been announced by the Keystone Lubricating Co., 3122 North 21st St., Philadelphia 32. The new Keystone Grease No. 32 reportedly retains its plasticity, tenacity and density in temperatures from sub-freezing to its melting point, which exceeds 400 deg. F., and repels water, even at boiling temperatures. Packed in rigid leak-proof paper cartridges that fit specially designed gun applicators, the grease is fed through the nozzle in a broad ribbon, which assures its reaching the pressure side of the gear teeth, and can be used even while the gears are in motion, the company says.

NEW REAR-DUMP WAGON, the E-16 Tournarocker, has been announced by R. G. LeTourneau, Inc., Peoria, Ill. Designed to be loaded by shovel or dragline, the Tournarocker is powered by the new 150-hp. Model C Tournapull, has a struck capacity of 16½ yd., or 16 tons, and offers speeds ranging from 2.19 to 17.3 m.p.h. forward and 2.19 to 4.38 reverse. Its wide top opening and low body, 6½ ft. high, is said to permit easy spotting at the shovel, while positive-power electric steering, plus a 90-deg. turning radius and the ability to turn around in a 12½-ft. radius, reportedly make the unit highly maneuverable.



THIS NEW TYPE fire truck is the first to use dry chemical as the primary extinguishing agent, according to the manufacturer, Ansul Chemical Co., Marinette, Wis. It carries 2,800 lb. of dry chemical and 250 gal. of water and weighs 21,500 lb. fully loaded. The truck has a four-wheel drive, five forward speeds and one reverse, with maximum governed speed of 62 m.p.h. Four extra compartments on the sides house accessory fire and rescue equipment.

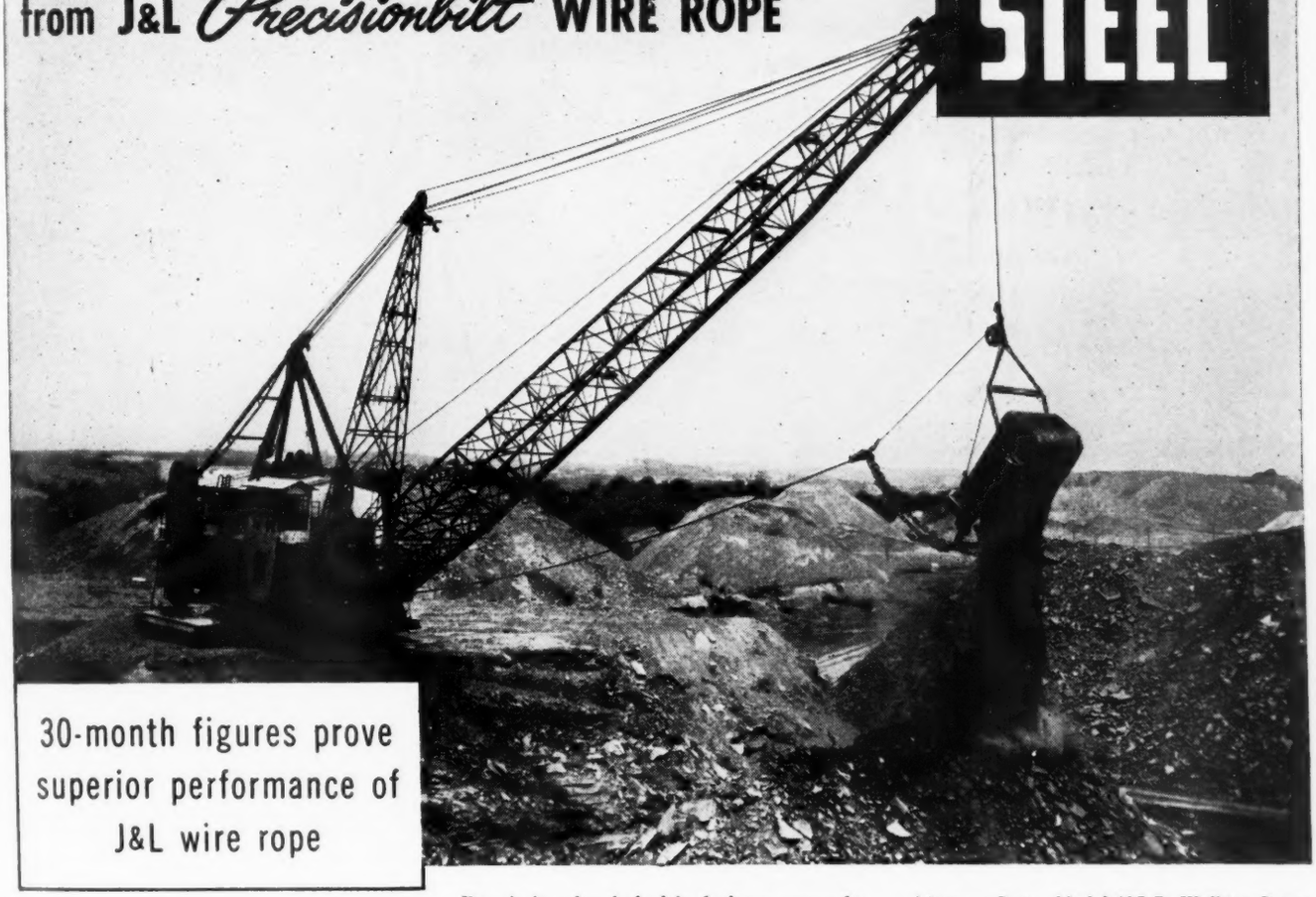
LOW-VOLTAGE CONTROLLERS—New line of metal-enclosed controllers for use with a.c. motors up to 800 hp. (at 550 volts) and for d.c. motors up



to 350 hp. (at 230 volts), announced by General Electric's Control Division, Schenectady, N. Y., are designed for

Central Ohio Coal Company* gets L-O-N-G-E-R service from J&L *Precisionbilt* WIRE ROPE

J&L STEEL



30-month figures prove superior performance of J&L wire rope

For two and one half years, Central Ohio Coal Company of Zanesville, Ohio, has kept detailed records on the performance of wire-rope hoisting lines, draglines and dump cables used in their strip-mining operations. These records prove that, among the several different brands used, J&L Wire Ropes gave *more days of service* and moved *more cubic yards of overburden.*

Here are the average performance figures:

Dragline—50% longer service life than competing wire ropes. (J&L Precisionbilt 2¼" dia. Type "U" Lang Lay)

Hoisting Line—30% longer service life than competing wire ropes. (J&L Precisionbilt 1¾" dia. 6 x 37 Lang Lay)

Dump Cable—More than twice the service life of competing wire ropes of ⅛" larger diameter. (J&L CenterFit 1⅛" dia.)

But it is what's behind these records that counts! Both J&L and Central Ohio "know their ropes." J&L knows how to build wire ropes and what type to recommend for every job. Central Ohio knows how to operate them for the longest and most profitable service. This means not only correct application, but also *proper, engineered care.*

—And what is "proper, engineered care?" Why not let a J&L Wire Rope service engineer tell you? He's a specialist in wire rope application. He knows how to get the most out of every inch of hoisting line, dragline, logging rope, marine cable, oil-country line—or wire rope in any other application.

If you would like to have a J&L engineer call on you, write us. The coupon is for your convenience.

*Affiliated with Ohio Power Company in the American Gas and Electric System.

JONES & LAUGHLIN STEEL CORPORATION

Above—*Page, Model 627 S, Walking Dragline, with 12-1/2 yd. bucket. J&L Wire Rope for hoisting line, dragline and dump cable.*

Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 30, Penna.

Gentlemen:

We are interested in learning how to get more service from our wire ropes. Please have a J&L engineer call on us.

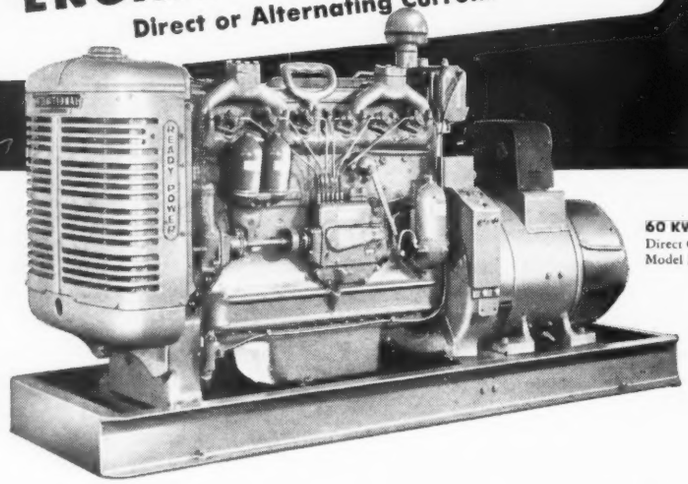
Name.....

Address.....

Independent Electric Power for the Mines!

READY-POWER ENGINE GENERATORS

Direct or Alternating Current



60 KW
Direct Current
Model RD18D60

Where Electric Power—generated at the mine—is needed —Ready-Power Standardized Engine Generators are available for early delivery. Built for this service from standardized designs developed after years of experience, Ready-Power will give you—QUICKLY—Dependable, Low Cost, Electric Power.

Ready-Power Engine Generators are powered by International Harvester Engines—sold and serviced everywhere by International Harvester Power Unit Dealers.

Rated at 7½ to 85 KW AC or 7½ to 100 KW DC.

The READY-POWER Co. 11231 FREUD AVE. DETROIT 14, MICH.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.

Extra-long journal springs assure better trackability.

Large motor, to assure more horsepower per ton weight of locomotive.

Can be equipped with hydraulic brake.

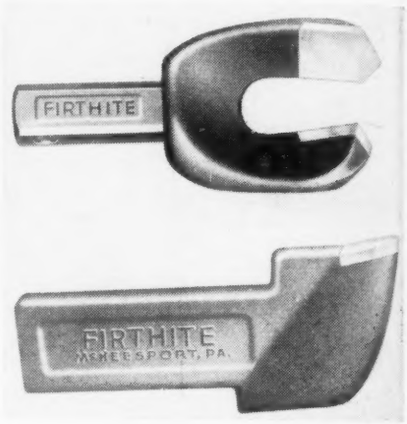
GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons – either single or double motor drive – 16" to 56½" track gauge.

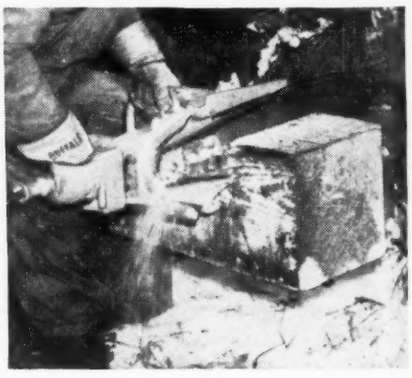
All Greensburg Locomotives are **CUSTOM-BUILT** *to your requirements*

THE GREENSBURG MACHINE CO. 101 STANTON ST. **GREENSBURG, PA.**

controlling squirred-cage, wound-rotor, synchronous or multi-speed a.c. or d.c. motors. Included in the one unit, it is pointed out by the manufacturer, are not only the conventional equipment required to start, stop or control such motors, but also a completely integrated draw-out air circuit breaker that provides adequate short-circuit protection (either 25,000 or 50,000 amp.) and is readily interchangeable for servicing.



DRILL AND CUTTER BITS—A completely new line of Firthite sintered tungsten-carbide bits for both underground and strip mining has been announced by Firth Sterling Steel & Carbide Corp., McKeesport, Pa. Composed of a hard alloy made by powder metallurgy, the Firthite tips are brazed into a shank of drop-forged heat-treated steel and are said by the manufacturer to outlast and outwear steel bits many times, to stay sharp longer, cut faster, maintain hole size and permit numerous resharpenings. Both the cutter bits, made for use with all standard chains, and the auger bits are made in two types for ordinary and heavy-duty work. Firthite percussion drill bits and bits for exploratory drilling also are available.



ELECTRIC CHAIN SAW designed for one-man operation and weighing only 27 lb. has been announced by the Homelite Corp., 2901 Riverdale Ave., Port Chester, N. Y. The unit will fell trees up to 36 in. in diameter, it is said, and can be used by one man for felling, limbing or bucking trees, or cutting heavy timbers or piling. The

Each Rollway Bearing takes only its specific load . . . The radial bearing takes radial loads; the thrust bearing takes thrust loads. In this simple but effective way, Rollway's Right Angle Loading eliminates compound loads and complicated stresses. Specifically, it splits your load in two.

Rollway Right–Angle–Loading helps your machines to run longer . . . under heavier loads . . . with lower maintenance cost

It reduces the unit loading on rollers and bearings. Insures lower starting and running torque. Eliminates all resultants from oblique loads, all piling up of thrust and radial loads on the same bearings. Reduces roller end-rub and roller wear-back . . . avoids roller pinch-out . . . provides greater resistance to shock.

Lower maintenance!
Fewer shut-downs!
Less replacements!

FREE SERVICE

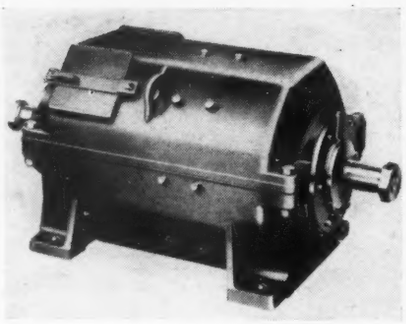
Send us your designs for bearing analysis and recommendations. All information held confidential.

ROLLWAY BEARING CO. INC.
Syracuse, N. Y.

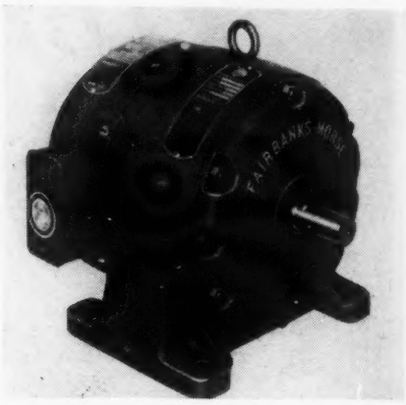
ROLLWAY
RIGHT-ANGLE-LOADED
BEARINGS

OFFICES IN: PHILADELPHIA • BOSTON • PITTSBURGH • CLEVELAND • DETROIT
CHICAGO • MINNEAPOLIS • BIRMINGHAM • HOUSTON • LOS ANGELES

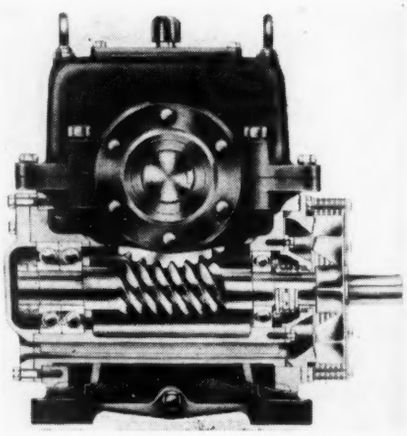
saw is powered by a high-cycle induction-type a.c. motor with a direct-gear drive. Current is supplied by a Homelite Dual-Purpose high-cycle gasoline-engine-driven generator, available in either 2,500- or 5,000-watt sizes, which may be also used for other tools or floodlights. All of the saw's moving parts are pressure-lubricated by a single plunger pump and sealed ball bearings support the motor and sprocket shafts.



ELECTRIC MOTOR—New 600 Series mill motor recently added to its line of d.c. steel mill motors by the Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., is said to be adaptable for use totally enclosed non-ventilated or separately ventilated and can be furnished for self ventilation. Shortened bearing housings, careful proportioning of field pole design and other modern developments in design and materials convert inactive space and weight into greater driving power for the unit, the company reports.



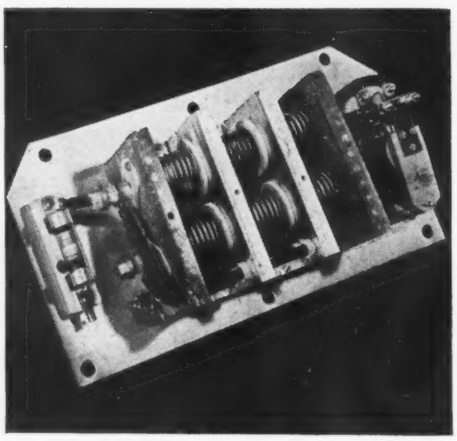
MOTOR REDUCER — Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago, has announced that its axial air gap motor is now available as a motor reducer in ratings from ¾ to 10 hp. Said by the company to be the most compact gear motor available, the unit is symmetrical in design, with no separate right-hand or left-hand assemblies. The motor also may be removed from the gear housing and operated separately. Two ratios of single helical gears arranged in simple gear trains are employed, resulting in the highest efficiency available in the mechanical transmission of power, it is said.



WORM GEARS—New line of "Hypower" enclosed worm gear drives in both horizontal and vertical types has been announced by Foote Bros. Gear & Machine Corp., 5225 So. Western Blvd., Chicago, Ill. Said to be smaller in size than conventional drives of equal capacity and delivering power at lower cost, the units also permit the use of a smaller, less expensive reducer because of their high thermal capacity.

METAL HARDENING — Its new "Carburit" paste offers an excellent case-hardening job without special equipment, may be easily used for selective hardening and is faster than conventional methods, according to the Denfis Chemical Laboratories, Inc.,

D. C. MOTOR



STARTERS TYPE CMS

Smooth acceleration. Elimination of commutator arcing. Fusetron Motor protection. Simplest possible construction. May be obtained with manual starting switch as type MMS.

Write for **GUYAN** *Bulletins.*

GUYAN MACHINERY CO. LOGAN W. VA.

FLEXIPIPE

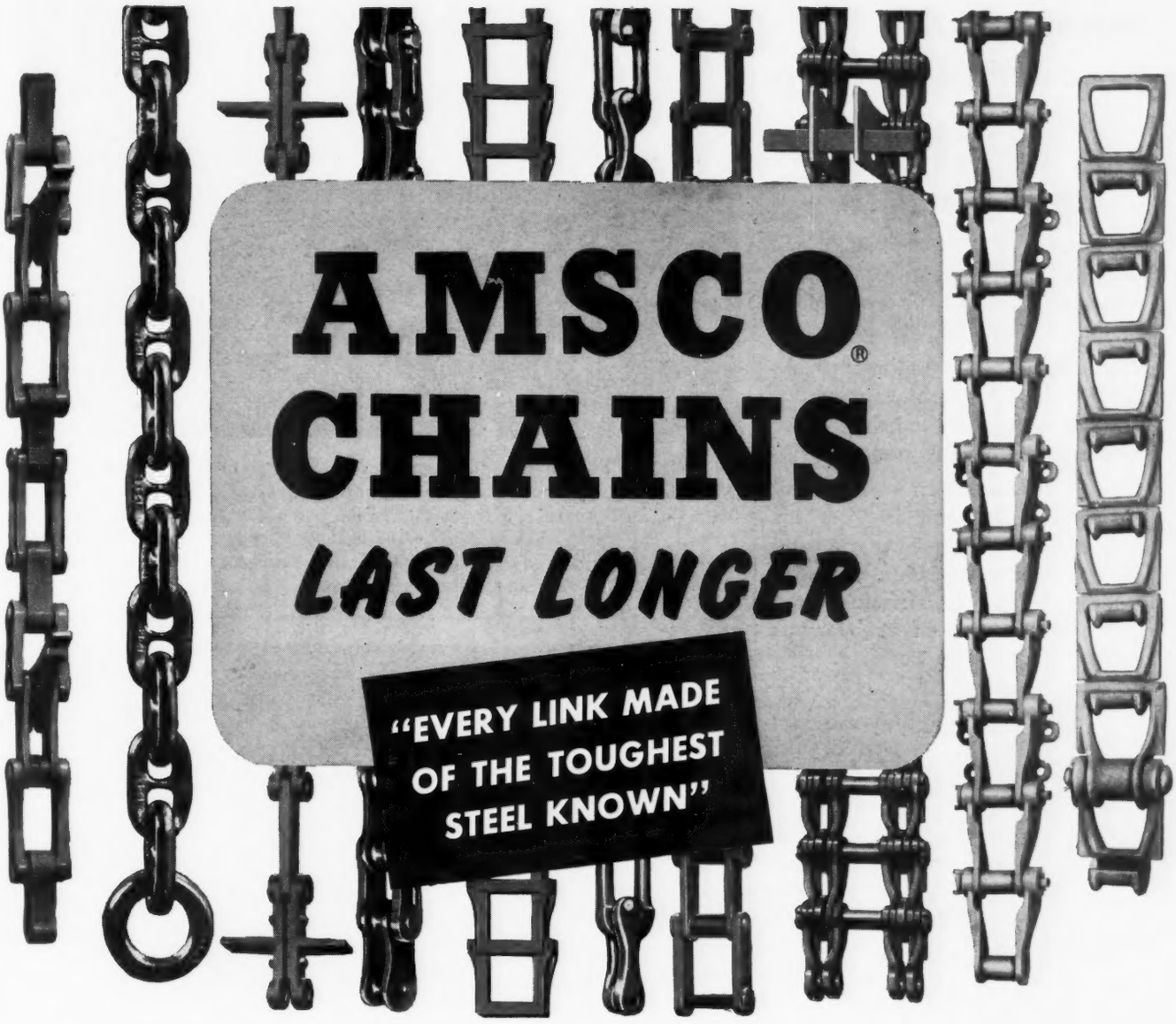
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information

BEMIS BRO. BAG CO.

412 Poplar Street, St. Louis 2, Mo.



Replacing ordinary elevating and conveying chain is a constant drain on profits . . . a constant source of production tie-ups and delays. Stop all these worries today by installing Amsco manganese steel chain in the really tough services. It often repays its own cost many times over by its tough resistance to breakage stresses and its outstanding wear resistance.

Here's the kind of service users report: 25 months with little wear versus 8 months; 27 months with 2 years' service left where ordinary chain lasted only 3 months.

With a test-bar tensile strength of 125,000 lbs. (average test), high ductility, and a surface that work hardens to as high as 550 Brinell, Amsco manganese steel chain withstands severest stresses and grinding abrasion . . . it can be used without lubrication in dust-laden atmospheres.

Added to this is the Amsco engineering design experience that will help to meet your problem with the one best chain for trouble-free service. Write for Bulletin 742-CN . . . and let us quote on your requirements.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

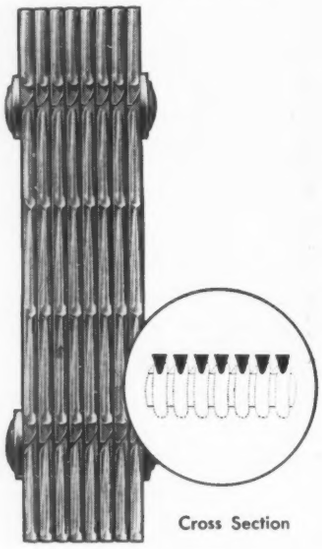
What are the production costs on

DIRT?

Every ton of raw, unwashed coal shipped from the mines is 15% dirt—useless dirt that costs good dollars to mine and ship to the customer.

That's why major operators throughout the industry are planning for up-to-date washeries to help produce cleaner, more saleable coal.

If your plans call for a washery, call in a Cambridge engineer for his recommendations on dewatering and classifying screens of Cambri-Wedge Riffle Surface wire . . . manufactured under the patent of the famous British Wedge Wire Co., Ltd.



Cross Section

Cambri-Wedge wire screens are available in a wide range of metals, including stainless steel—in mesh sizes ranging upwards from .005"—and in any length or width of flat or Riffle Surface.

They offer you free drainage—freedom from clogged openings—and maximum screen rigidity.

For full information on Cambri-Wedge screens, write for free folder.

Cambridge
WIRE CLOTH CO.

Department M • Cambridge 11, Md.

SALES OFFICES IN: BOSTON • NEW YORK
BALTIMORE • PITTSBURGH • DETROIT
CHICAGO • SAN FRANCISCO • ST. LOUIS

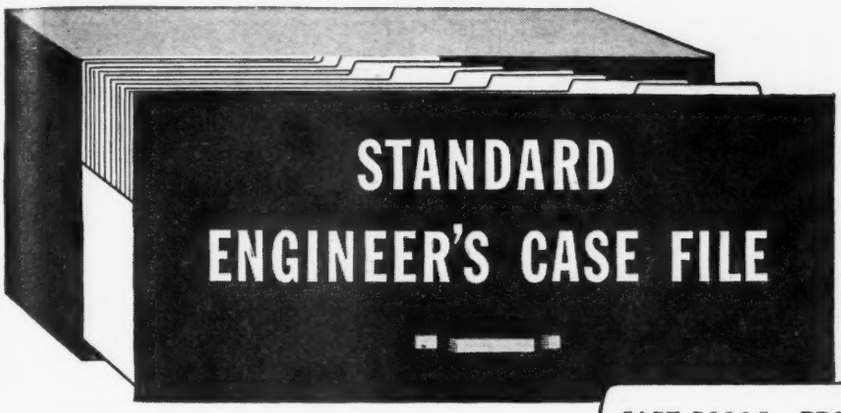
DESIGNED FOR heavy duty construction and maintenance work, this new AD-4 motor grader recently announced by the Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., is said to offer new design and performance features. The unit is powered by a 104-brake-horsepower General Motors two-cycle diesel engine and has six speeds forward from 2.4 to 16.6 m.p.h. and three reverse speeds ranging from 2.8 to 6.2 m.p.h.

EARTHMOVER—This small-sized unit announced by R. G. LeTourneau, Inc., Peoria, Ill., for high-production earthmoving on small yardage projects such as small strip mines, road building and many odd jobs, is the Model D Roadster Tournapull designed for self-loading and one-man operation. Powered by a 100-hp. diesel or gas engine, this prime mover, which travels at speeds up to 25 m.p.h., is used with the E-9 Carryall Scraper, a 9-ton, or 7-cu. yd., heaped capacity unit.

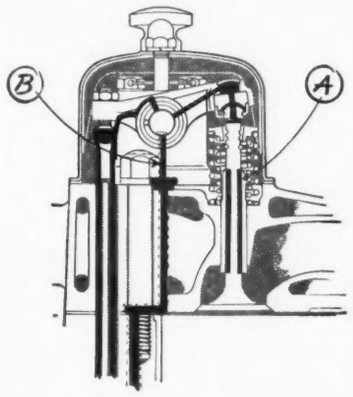
172 Pacific St., Brooklyn 2, N. Y. After the work covered with Carburit is heated to 1,700 deg. F., a case 0.010 in. thick will form in 5 to 7 minutes, with only 25 to 30 minutes required for a 0.040-in. case, it is said. The work is then cooled and reheated to 1,500 deg. F., when the paste is knocked off and the work is quenched. Any source of heat may be used, it is reported.

MULTIPLE OILER—Steady reliable drop-feed oiling to multiple points, with oil fed by gravity from a reservoir through multiple gang-mounted sight-feed valves to a number of individual bearings, is offered in the new multiple oiler announced by the Oil-Rite Corp., 3491 South 13th St., Milwaukee 7, Wis. One unit can replace 2 to 24 individual oilers, with only one reservoir to fill and one shut-off lever to operate, it is said, and oil fed to each bearing can be conveniently adjusted and observed at one station.

MATERIALS - HANDLING CONTROL—A new smaller Bantam BinDicator has been announced by the BinDicator Co., Detroit 15, Mich., for use on very small hoppers, spouts, chutes and conveyors and other applications where the standard unit cannot be used because of its size. Both units are diaphragm-operated switches in sealed housings that are mounted on the outside of bins, hoppers, screw conveyors, etc., to signal



CASE D119C--PROVIDING GOOD VALVE ACTION IN DIESEL ENGINES.



DIESEL ENGINE VALVE ASSEMBLY

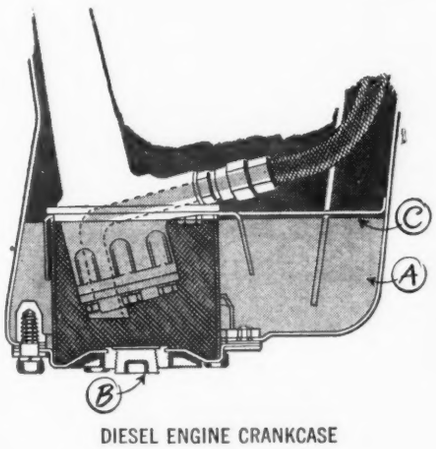
When Diesel engines, operating in tough heavy-duty service, were lubricated with compounded RPM DELO Diesel Engine Lubricating Oil, valve stems and guides did not gum up. They received thorough lubrication at all times and wear was negligible. RPM DELO Oil is recommended for all types of Diesels. Comes in several viscosity grades to meet all conditions.

A. Specially selected oxidation-resistant base stocks and special compounds prevent formation of gum and lacquer . . . oil film adheres to hot or cold metal surfaces.

B. Detergent compound keeps oil passages clean and open . . . and allows free flow of adequate supply of lubricant to wear points.

RPM DELO Diesel Engine Lubricating Oil is non-corrosive to all bearing metals. This quality and high stability assure sound bearings in Diesels for long service periods.

CASE D119D--KEEPING PARTS CLEAN AND REMOVING CONTAMINANTS FROM DIESEL ENGINES.



DIESEL ENGINE CRANKCASE

Cylinder walls, pistons, bearings and other parts of Diesel engines in heavy-duty service remained free of lacquer, and all contaminants flowed out with drainings when RPM DELO Diesel Engine Lubricating Oil was used.

A. A special compound in RPM DELO Oil loosens and removes lacquer and other deposits from parts and oil passages . . . and they stay harmlessly dispersed in the oil.

B. The finely dispersed contaminants, including condensate and dust, flow out freely when crankcases are drained.

C. Another compound in RPM DELO Oil prevents foaming —allows accurate measurement of oil levels and delivery of sufficient lubricant by oil pumps.

The engine-cleaning qualities of RPM DELO Oil help reduce wear on parts and prolong greatly the operating periods between engine overhauls.

DISTRIBUTED BY

GORDON LUBRICATING COMPANY

In Pennsylvania, Ohio, West Virginia, Kentucky

Box 313, McKees Rocks, Pa. Phone Federal 3200

PRODUCT OF THE CALIFORNIA OIL CO.

DIESEL ENGINE RPM DELO LUBRICATING OIL

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PROMET
THE Engineered BRONZE
BEARINGS
COST LESS
because they wear longer
WEAR LONGER
because of a specific formula for every requirement

AXLE BEARINGS, JOURNAL LINERS, BUSHINGS, AND WEARING PARTS FOR GENERAL ELECTRIC, SULLIVAN, WESTINGHOUSE, GOODMAN, OLDROYD, JOY, JEFFREY EQUIPMENT.

PROMET BABBITT

Lead or tin base. 3 grades.

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PROMET BAR STOCK

Round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by 1/8" steps) from 1/2" minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

THE AMERICAN CRUCIBLE PRODUCTS CO., 1307 Oberlin Ave., Lorain, Ohio, U. S. A.
Prompt deliveries can usually be made from stocks maintained at

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MT. LEBANON, PA., J. E. Nieser 720 Roselawn Ave. . . . . Phone LE-9876
NEW YORK CITY, Trans American Commerce Co., Inc., 165 Bdwy. . . . . Phone COrtlandt 7-4340
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Other Representatives

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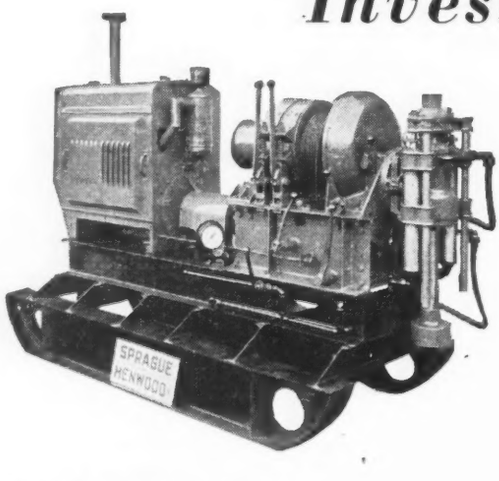
BIG STONE GAP, VIRGINIA C. P. Cawood . . . Box 290

Investigate



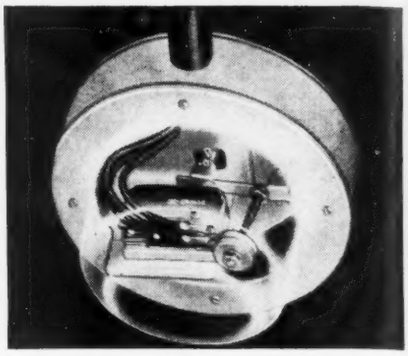
this MODERN Core-Drilling Machine

It's Engineered to Meet Your Most Severe Demands

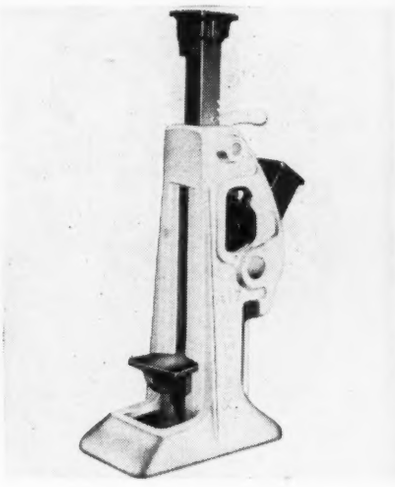
Sprague & Henwood Core Drilling Machines are modern in every respect. . . . Can EASILY perform the work expected of them! That's because they are built to meet the demand of present day core drilling work! The machines are high speed, exceptionally sturdy, constructed to withstand rugged service. Available with two distinct types of feeds. "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.

Bortz DIAMOND BITS are also manufactured by Sprague & Henwood. Full details sent upon request.

SPRAGUE & HENWOOD, INC.
Department K SCRANTON, PA., U. S. A.

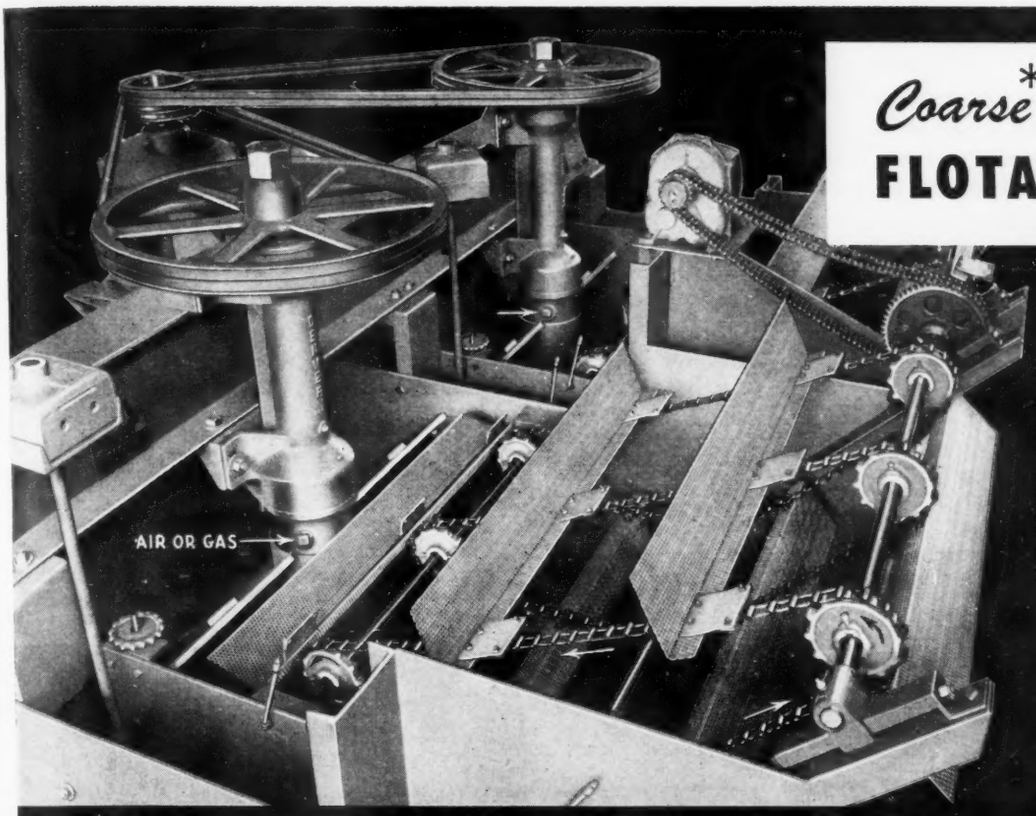


changes in material levels and automatically start and stop filling and emptying equipment at designated levels.



ALUMINUM-ALLOY HOUSING for light weight and easy handling is featured in the new 15-ton-capacity No. A-17 Simplex track jack announced by Templeton, Kenly & Co., Chicago 4. All housing sections are increased 40 percent to provide strength and durability equivalent to malleable-iron housings and the jack sets more firmly in ballast because of the extra-large forged toe lift, according to the manufacturer.

NEW MODEL 21 BW Whiteprinter intended for moderate-volume print production utilizes the complete range



*Coarse** COAL FLOTATION

Working directly with the Bureau of Mines Coal Preparation Section, and with large coal companies engaged in solving the problem, Denver Flotation Engineers designed a Flotation Machine which does an effective job of coal cleaning as will be noted in the tabulations below from Bureau of Mines Report of Investigations 4306, July 1948.

Marketable results are obtained on varying types, grades and sizes of coal fractions.

with DENVER "SUB-A" FLOTATION MACHINES

PROBLEM • Treating coal fractions from 1/16"-0. Two objectives are sought—

1) *to save marketable grade of coal in these sizes and*

2) *eliminate stream pollution from wasted slurry water.*

These coal fractions cannot be satisfactorily cleaned by "gravity" methods. With flotation remaining as the most acceptable solution, a prime consideration is that the flotation machine used must be capable of handling both coarse and fine sizes effectively. The rapid rising, dense agglomerate type "matte" coal concentrate must be removed and dewatered in large volume.

SOLUTION • No commercial flotation machine can treat both coarse and fine sizes so effectively as the Denver "Sub-A." This selective feature plus its extreme mechanical and metallurgical flexibility makes it the logical choice for coal cleaning work.

Removal and dewatering of the dense agglomerated "matte" concentrate was accomplished with special "deep-digging" punched plate rakes which carry the 7"-8" coal matte up the spitzkasten allowing surplus water to drain back in the pulp through the perforated rakes. Further dewatering is carried out in a wedge bar compression screw conveyor. Surplus water returns via middling feed pipe to the Denver "Sub-A" Flotation cell for re-use, thus eliminating surplus slurry water.

	SCREEN SIZE, MESH	FEED		CLEANED COAL		REFUSE		DISTRIBUTION, %		Reagents, lbs. per ton feed
		Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Cleaned Coal	Refuse	
MINE I *	**10 to 14**	**18.8**	**11.9**	**23.0**	**6.2**	**9.1**	**31.6**	**77.6**	**22.4**	Kerosene, 3.27
	14 to 35	**51.4**	**19.1**	**56.0**	**7.6**	**31.9**	**65.3**	**80.1**	**19.9**	B-23 Frother, 0.24
	35 to 100	23.3	40.3	17.0	13.4	35.6	81.8	60.7	39.3	Pine Oil, 0.11
	Through 100	6.5	58.3	4.0	19.3	23.4	84.0	39.7	60.3	
	Composite through 10	100.0	25.2	100.0	8.7	100.0	72.5	74.1	25.9	
MINE II *	**10 to 35**	**64.2**	**10.5**	**58.2**	**3.4**	**54.0**	**50.7**	**85.0**	**15.0**	Kerosene, 3.46
	35 to 100	22.6	10.5	26.9	4.6	22.2	66.2	90.4	9.6	B-23 Frother, 0.26
	Through 100	13.2	12.8	14.9	6.3	23.8	64.8	88.9	11.1	Pine Oil, 0.20
	Composite through 10	100.0	10.8	100.0	4.2	100.0	57.5	87.6	12.4	

1*—Moisture free basis

CONSULT WITH YOUR DENVER "FLOTATION ENGINEERS"

"The firm that makes its friends happier, healthier and wealthier"

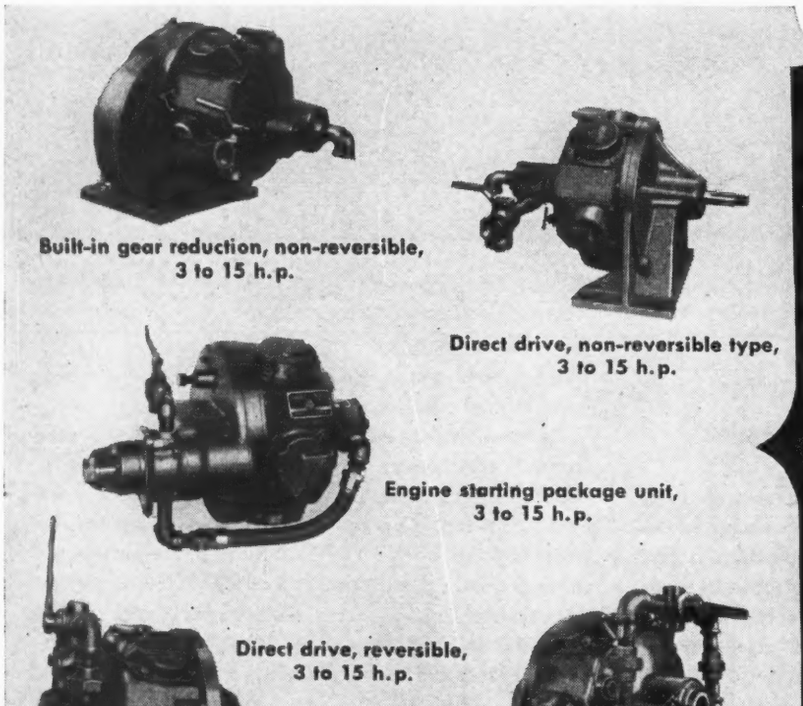
DENVER EQUIPMENT COMPANY
P. O. BOX 5268 • DENVER 17, COLORADO

DENVER • NEW YORK CITY • CHICAGO • TORONTO • VANCOUVER • MEXICO CITY • LONDON • JOHANNESBURG • RICHMOND, AUSTRALIA

NO other kind of power excels *air* power in safety, flexibility, freedom from damage due to overloading, and simplicity of control. That's why Gardner-Denver air motors find such a wide application. These 5-cylinder radial air motors are remarkably compact. They can be controlled to operate at any desired speed up to their maximum r. p. m. They have unusually high torque for high starting loads. They are simple, durable and light in weight.

for greater flexibility, safety, convenience . . .

GARDNER-DENVER AIR MOTORS



Built-in gear reduction, non-reversible, 3 to 15 h.p.

Direct drive, non-reversible type, 3 to 15 h.p.

Engine starting package unit, 3 to 15 h.p.

Direct drive, reversible, 3 to 15 h.p.

Built-in gear reduction, reversible, 3 to 15 h.p.

MINING—Shaft muckers, ore chute gates, mine hoists, mine locomotives, bit grinders, diamond drills, ventilating fans and blowers.

CONSTRUCTION—Grout and concrete mixers, earth augers, conduit augers, bit grinders.

INDUSTRIAL—Gas line and pipe cleaners, conveyor belts, mixers, blast furnace doors, pumps, bending rolls.

MARINE—Engine starting, jib cranes, ship steering units, capstans, towing winches.

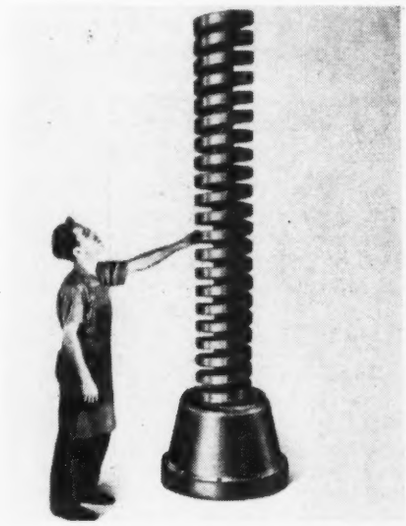
SAWMILLS & LOGGING—Chain saws, sawmill carriages, edger feeds.

OIL FIELD—Engine starters, blowout preventer valves, hydraulic pump drives.

For complete information, write Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER SINCE 1859

of Bruning BW media in reproducing drawings and forms from ink, pencil, typewritten or printed translucent or transparent original material, according to the Charles Bruning Co., Inc., Chicago 4. The unit is continuous in operation and exposes and develops cut sheets or roll stock up to 42 in. wide and in any length. Only an electrical outlet is necessary for installation, with no plumbing or exhaust ducts required.



ELEVATING OR LOWERING various types of bulk materials can be accomplished without use of buckets, sprockets, gears, chains or motors by application of Syntron "Controlled Vibration" to a spiral elevating ramp, according to the Syntron Co., Homer City, Pa. High-speed vibration is the moving force, with the flow controlled by a rheostat or reactor provided. The units now are available in limited heights and diameters, the maximum tonnage required determining the diameter of the spiral ramp.

•

Industrial Notes

Cambridge Wire Cloth Co., Cambridge, Md., has appointed Paul V. Thomure district sales engineer for the company's St. Louis Office, covering states of Missouri, southern Illinois, southern Indiana, Kentucky and Tennessee. The company also has opened a sales office in Houston, Tex., to cover a territory including Texas, Oklahoma, Arkansas, Louisiana and Mexico. Charles E. Shuman is district sales engineer in charge of the new office.

Frank G. Hough Co., Libertyville, Ill., has named G. A. Gilbertson a vice president. Mr. Gilbertson was formerly assistant sales manager, Industrial Power Division, International Harvester Co.

Link-Belt Co., Chicago, has appointed Nortons-Tividale, Ltd., Tividale, Tipton, Staffordshire, England, as ex-

Extra SAFETY... *Extra* DURABILITY

...*Extra* OPERATING EASE...

WITH

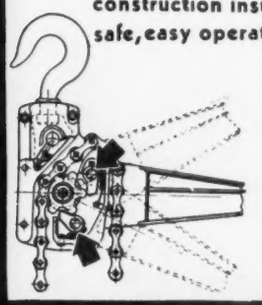
COFFING

SAFETY-PULL HOISTS

Check these features that give longer hoist life, greater ease of operation—

- Hooks of drop forged heat treated steel
- Each model pre-tested to 100% overload
- Reversible handle permits operation in any position
- Coffing exclusive dual ratchet and pawl assembly for maximum safety
- "Safety Load" handle—bends before other parts will break
- Nine models in capacities from ¼ to 15 tons

Sturdy, simple pawl construction insures safe, easy operation.



Write for Bulletin RL-3

COFFING HOIST CO.

DANVILLE • ILLINOIS

RATCHET LEVER HOISTS • LOAD BINDERS • SPUR GEAR HOISTS • ELECTRIC HOISTS • DIFFERENTIAL HOISTS TROLLEYS

STOP UNLOADING WORRIES

Freezeproof your coal with WYANDOTTE CALCIUM CHLORIDE

Unloading coal *is* a worry when it's frozen in the car. Time and labor are wasted in cracking it. Railway cars are kept idle. Dealers can't meet delivery schedules.

You can easily save your dealers this expense and inconvenience. Freezeproof your coal with Wyandotte Calcium Chloride.

Coal treated with Wyandotte Calcium Chloride is readily handled at the yard—even in sub-zero weather. It comes out of the car the same grade as it went in—not battered, smashed or cracked. And no special equipment is needed to handle Wyandotte Calcium Chloride for freezeproofing.

The coupon will bring you full information about this safe, dependable and economical agent for treating coal.

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____

Address _____

Title _____

Wyandotte REG. U. S. PAT. OFF. CALCIUM CHLORIDE

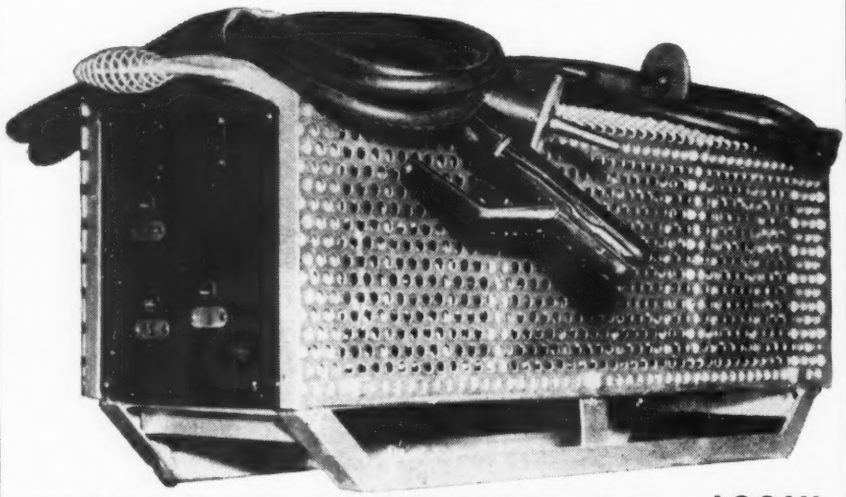
WYANDOTTE CHEMICALS CORPORATION

MICHIGAN ALKALI DIVISION, Wyandotte, Michigan

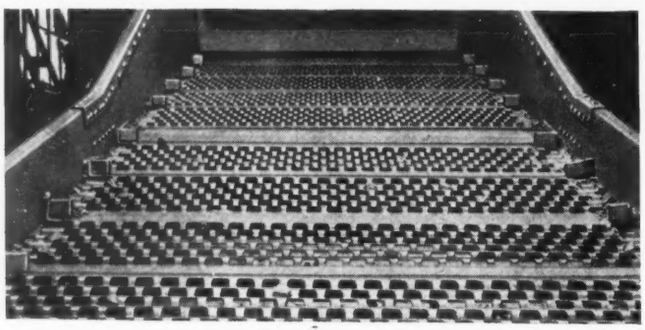
A TRULY PORTABLE BOND WELDER!

Easily dragged even in low coal. Thin design permits easy removal from cars • Quick change taps provide proper welding current for all requirements.

Write for bulletins.



GUYAN MACHINERY CO. LOGAN W. VA.



148 SLOT SIZES

in Flanged Lip Screens meet exacting requirements

As specifications for sizing and dewatering coal have become increasingly exacting, the advantages of HENDRICK FLANGED LIP SCREENS are more and more widely recognized.

The staggered slots are practically non-clogging, and the step at the end of each slot aids in producing faster and cleaner separation of the material. Made with short, medium or long slots. 148 different standard slot sizes are available. Write for new edition of Flanged Lip Screen booklet.

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Perforated Metal Screens
Wedge-Slot Screens
Mitco Open Steel Flooring
"Shur-Site" Treads and Armorgrids

Manufacturing Company

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Sales Offices In Principal Cities

clusive vendors and manufacturers in the United Kingdom of the Link-Belt "Float-Sink Concentrator."

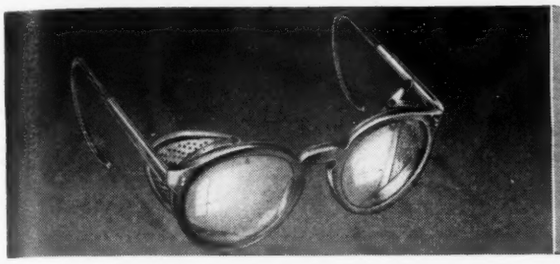
Gordon Lubrication Co., McKees Rocks, Pa., recently held an open house and inspection tour of its newly completed river terminal. The new installation has complete rail, truck, and tank-barge facilities and storage facilities for two million gallons of base stock and finished "RPM" oils, for which the company is distributor. The new terminal will manufacture one million pounds of RPM greases per month under formulas and specifications of the California Oil Co. A complete modern testing laboratory for maintaining quality standards also is a feature of the new terminal.

Chevrolet Motor Division, Detroit, has named W. F. Armstrong general manager. A vice president of General Motors, Mr. Armstrong has been in charge of the corporation's manufacturing and real estate staffs since 1944.

Goodyear Tire & Rubber Co., Akron, Ohio, last month was to celebrate its 50th anniversary with a three-day program that included dramatic reviews, an epic motion picture depicting the story of American opportunity and produced especially for the celebration, business sessions, addresses by top officials of the company and a banquet in the company's huge gymnasium. Participating in the program were to be some 1,700 key executives of the company, several hundred of whom were being called back from all parts of the United States and from practically every foreign nation outside of the Soviet sphere. On the day of the program, the four-hundred-and-fifty-millionth pneumatic tire was to be produced in one of the Akron plants. The Akron celebration was expected to serve as a forerunner for anniversary dinners to be held in some 54 cities in this country where Goodyear has production or sales operations, and also in all foreign lands represented at the local gathering.

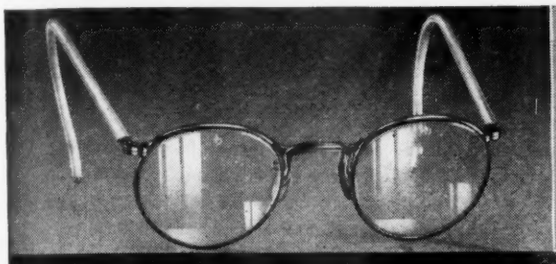
Converto Co., Pittsburgh, Pa., has announced the opening of its new Lawrenceville plant, said to be the first new fabricating plant opened in Pittsburgh since adoption of the F.O.B.-mill pricing system by the steel companies. While the plant, which is said to be one of the most completely equipped plants of the type in Western Pennsylvania, is primarily a fabricating job shop, according to company officials, it is also well equipped for production runs. Present jobs are being fabricated to specifications of manufacturers and contractors as far away as the West Coast, who are realizing the advantages of lower freight costs for fabricated products, it is reported. Among the facilities set up for specific industries is the design, engineering and fabrication of preparation-plant and tipple equipment for the coal industry. Even

In AO SPECTACLE SAFETY GOGGLES



AO ACETATE SAFETY GOGGLES
(Non-flammable cellulose acetate butyrate)
Especially recommended for chemical and electrical work and similar operations where sparks may cause fire or explosion.

Whether You Choose Acetate or Metal Frames



AO METAL SPECTACLE GOGGLES

You'll Be Sure of **Dependable Safety**

Whether you prefer AO Acetate or Metal Spectacle Safety Goggles, 6 Curve Super Armorplate Lenses assure you of dependable safety. In addition, you get the *plus values* of UNOBSTRUCTED VISION, MAXIMUM COMFORT AND SMART APPEARANCE! In both the AO F-9200 Series Acetate Goggles and the F-3100 Series Metal Goggles, men work *safely* and more *efficiently*. High set endpieces take hinges and temples out of the line of sight, provide a clear view of the work without obstruction. Ventilated side shields give extra protection on jobs where foreign particles may strike laterally.

Bridges are strong—yet light in weight for wearing ease. Nose pads give added comfort by evenly spreading goggle weight. Your MSA Representative can supply you with these pleasant-to-wear, good looking goggles in either metal or acetate.

Safety Division American Optical COMPANY

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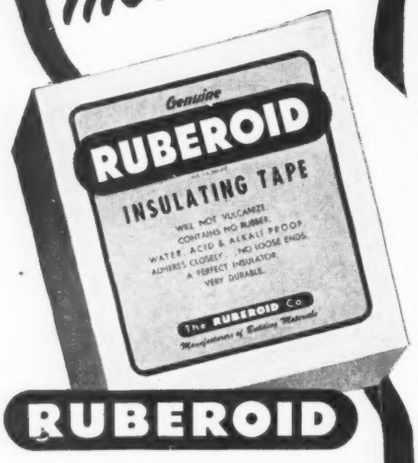

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• Because it's extra thick, just one wrapping of Ruberoid's Insulating Tape insulates valuable mining machine cables. Strong, tough, waterproof, this favorite tape does more than repair—it fortifies!

Check These Seven Features Only Ruberoid Has Them All!

1. Double grip—both sides adhesive
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7. Exceeds A.S.T.M. specifications . . .

—by 300% in adhesiveness
—26% in tensile strength
—290% in dielectric strength!

The RUBEROID Co.

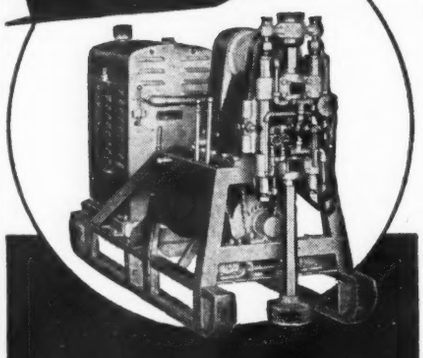
QUALITY BUILDING MATERIALS
500 Fifth Ave., New York 18, N. Y.

Hewitt-Robins Establishes Charleston Warehouse

FIRST WAREHOUSE FACILITY established outside plant headquarters for "out-of-stock" shipments of complete mine conveyors, including belting and machinery, recently was opened at 1010 Pennsylvania Ave., Charleston, W. Va., by the Robins Conveyors and Hewitt Rubber Divisions of Hewitt-Robins, Inc. Inventory of mine conveyors and equipment will total more than $250,000, it is reported, and other company products also will be available soon. Rapid industrial development of the southern states was an important factor in the company's decision to expand facilities to meet the needs of customers in the area, according to company officials

though the plant has just been completed, several tipples are now being erected by Converto field crews, the company states. The Converto Co. has for some years operated two fabricating and manufacturing plants in Indiana.

Diamond Core Drilling
CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas; horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

Hewitt-Robins, Inc., New York, has appointed C. W. Staacke as a technical consultant and special assistant to Thomas Robins Jr., president of the company. Mr. Staacke, whose duties in the newly created post will include co-ordination of the research and development facilities of the company's several divisions, was a member of the engineering staff of the B. F. Goodrich Co., for the past 22 years.

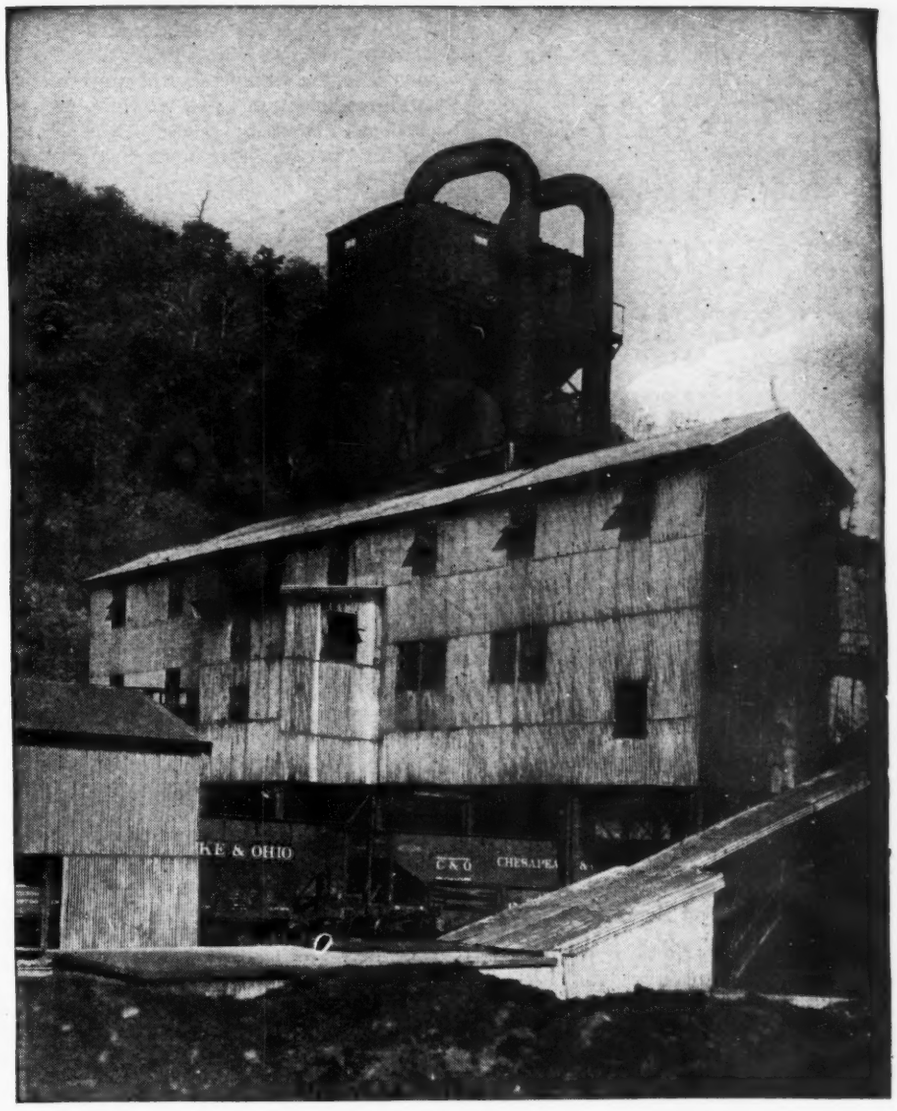
Streeter-Amet Co. has appointed Harry K. Franklin, formerly service manager of its Chicago office, branch manager of the Pittsburgh office. In addition to his new duties, Mr. Franklin will continue in complete control of maintenance and service for the company from Pittsburgh.

Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has appointed Lester B. Hamersley sales promotion manager. Mr. Hamersley was formerly assistant sales manager, Signode Steel Strapping Co., Chicago, and previously division manager, Fairbanks, Morse & Co.

Chain Belt Co., Milwaukee, Wis., has appointed as distributors Persingers, Inc., Charleston, W. Va., and Persinger Supply Co., Inc., Williamson, W. Va. Both companies will handle the merchandise products of the conveyor division of the Chain Belt Co.

Baker Industrial Truck Division, Baker-Raulang Co., Cleveland, Ohio, has appointed Fred R. Ramsen, 2120 South Seventh St., St. Louis 4, Mo.,

Pangborn Makes Coal Dust Behave



Desire for increased safety and improved working conditions—lower-cost equipment maintenance—efficient coal dust disposal and reclamation—elimination of nuisances—is responsible for the large number of Pangborn dust control installations in coal preparation plants.

For many years a "Pangborn" has been the recognized method of effectively collecting the fine coal dust that is produced in the operation of tipples, dry cleaning, de-dusting and other coal preparation facilities.

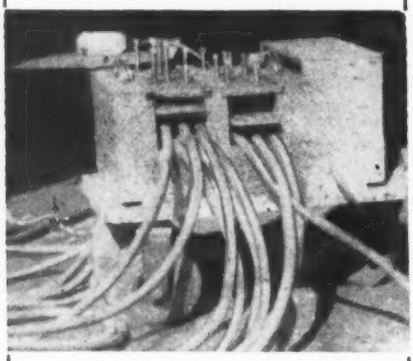
With this background of successful experience in the coal industry, Pangborn engineers offer you an effective and economical solution to your dust problems.

Write for free Bulletin 909A, "The Control of Industrial Dust". Address Pangborn, at 288 Pangborn Boulevard, Hagerstown, Md. *Look to Pangborn for the latest developments in dust control and blast cleaning equipment.*

Pangborn
DUST CONTROL
PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

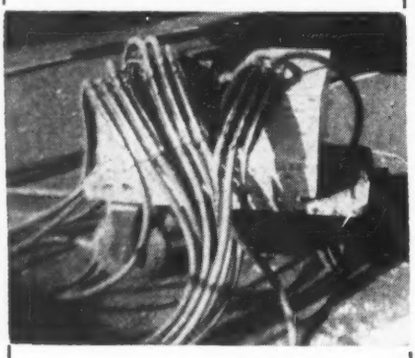
TURNS DUST LOSSES INTO PROFITS

LOW COST CABLE SPLICING FOR COAL MINES



All types and sizes of rubber-coated mine cable spliced and vulcanized.

Insulation on conductors is cured before outer jacket is applied and cured.



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Satisfaction guaranteed or you don't pay.

Write for quotations to:

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district sales representative in southern Illinois and eastern Missouri. Mr. Ramsen has had many years' experience in the automotive and material-handling fields and until very recently handled industrial sales in the St. Louis territory for a large manufacturer of crawler tractors.

Raybestos-Manhattan, Inc., Passaic, N. J., has named S. R. Zimmerman Jr. director of friction material research and development. In his new capacity Mr. Zimmerman will direct the company's research and development activities on its friction materials at its several plants. He has been with United States Asbestos Division, at Manheim, Pa., for 16 years, where he will continue to make his office.

Allis-Chalmers Mfg. Co., Milwaukee, has promoted B. F. Bisland, associated with the company since 1919, from manager of its Chicago district to manager of the company's newly formed Midwest region. J. C. Collier, who has been with A-C since 1916, succeeds Mr. Bilsland as Chicago district manager. A. J. Roubal has been promoted from chief draftsman for the crushing, cement and mining section of the A-C basic industries machinery department, to a position as staff development engineer of the department. George O. Verch has been named chief draftsman to succeed Mr. Roubal and Eugene G. Wutke has been appointed assistant chief draftsman of the department's pyroprocessing section, succeeding Mr. Verch.

Worthington Pump & Machinery Corp., Harrison, N. J., recently announced that about 25 students from opposite ends of the earth were scheduled to gather at the company's Harrison Works late in September to embark on a six-months' training program commencing Oct. 1. Upon satisfactory completion of his course of study, each student is to be awarded a certificate. Among the countries to be represented are Uruguay, China, Chile, Egypt, Cuba, Holland, Siam, France, Mexico and Canada.

Atlas Chain & Mfg. Co., Philadelphia, has appointed O. W. Schmidt central states district sales manager. Mr. Schmidt, formerly sales manager for the Shafer Bearing Co., Downers Grove, Ill., will maintain offices in Chicago.

New York Belting & Packing Co., Passaic, N. J., has appointed F. A. Maskell a sales representative to cover the states of Colorado, Utah, Arizona and New Mexico. He will make his headquarters in Salt Lake City.

Eaton Mfg. Co., Cleveland, Ohio, has appointed M. P. Winther vice president and director of engineering of the company. Mr. Winther has been associated with the company since March, 1946, when Eaton acquired Dynamatic Corp., Kenosha, Wis., of

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GUYAN FOOTWARMERS

Here, a small investment will pay big dividends. A comfortable worker stays on the job and works more efficiently!

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A Complete Line of Track and Trolley Products for the Mining Industry

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Airco Stainless Steel Electrodes

GIVE YOU SMOOTH, POROSITY-FREE WELDS ...FASTER...AT LESS COST

Metal fabricators find that Airco stainless steel electrodes produce porosity-free welds of smooth, uniform appearance . . . extremely important when sanitation, appearance or similar demands require highly polished, machined-down surfaces.

For example, one user says: "We were looking for a rod to fabricate stainless steel soup kettles. We tested them all—Airco 19-9 stainless produced the best welds. They were porosity-free, smooth and more uniform in appearance—just what we wanted."

Airco Stainless Steel electrodes are available for A.C.-D.C. application (titinia coating) . . . for D.C. application only (lime coating). Whenever possible, A.C.-D.C. electrodes are recommended because, when used on A.C., arc blow is eliminated. This means easier handling in all positions, more uniform arc action, and better appearance of deposit. Both types produce an easily removed slag coating.

For further information regarding Airco's extensive stainless steel electrode line, or any other arc welding electrodes, write for a copy of our latest Electrode Catalog (ADC-650). For your free copy, address Dept. CA-8773, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California. Represented Internationally by Airco Export Corporation.

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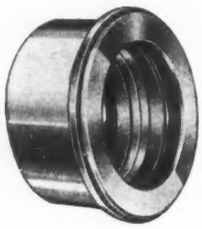
"Replacement"

SHAFT SEALS



ELIMINATE

Leakage and Repacking Nuisance

On centrifugal pumps, transmission shafts, magnetos, marine propeller shafts, rollnecks, etc.

The modern, economical method of eliminating shaft leakage.

Self-lubricating, "packaged" units (no conglomeration of small parts to fuss with) easy to install, just slide over the shaft and secure.

Standard seals for handling water, air, gases, petroleum products, etc. Withstand temperatures from —10°F. to +200° F., and pressures to 250 psi.

Special seals for corrosive and abrasive liquids.

Write for illustrated folder

SYNTRON CO.

975 Lexington, Homer City, Penna.

which Mr. Winther was president and general manager. He will continue as president of Dynamatic.

General Electric Co. has appointed Harold H. Watson commercial engineer of its construction materials department, Bridgeport, Conn. Mr. Watson joined GE in 1922 and for the past two years has been standards engineer for the GE appliance and merchandise department.

National Malleable & Steel Castings Co. has named Kenneth M. Smith assistant to Wilson H. Moriarty, vice president in charge of sales. From 1938 until recently, Mr. Smith was president of Lancaster Malleable & Steel Corp., Lancaster, N. Y.

American Car & Foundry Co., New York, has named J. F. Ginna, associated with the company for more than 30 years, assistant to the vice president in charge of production.

Pettibone Mulliken Corp., Chicago, has announced the purchase of The Universal Engineering Corp., Cedar Rapids, Iowa, and reports that it has now joined together the complete financial, production and sales facilities of four companies—Pettibone Mulliken Corp.; The Universal Engineering Corp.; George Haiss Mfg. Co., Inc., New York; and Beardsley & Piper Co., Chicago.

Hamilton-Thomas Corp., Hamilton, Ohio, has been formed to operate Economy Pumps, Inc., Klipfel Mfg. Co. and Liberty Planers, Inc., manufacturing divisions of Hamilton-Thomas. Officers of the corporation are Richard Thomas, president; L. G. Thomas, executive vice president; H. R. Ryan and R. H. Thomas Jr., vice presidents; E. T. Drinkuth, secretary; and L. V. Thomas, treasurer.

The Rome Cable Co., Rome, N. Y., has reported the death on Aug. 27 of Charles B. Llewellyn, active in the coal industry for many years and for the past 10 years a mining cable specialist for the company. At one time he served as a mine superintendent in several fields and later was a sales representative for electrical cable. He also was an active member of the power committee of the American Mining Congress.

•

Trade Literature

Available Without Charge on Request to the Manufacturer

PULLEYS—Continental Gin Co., Industrial Division, Birmingham, Ala. Catalog, 'Continental Pulleys," contains latest prices and data on transmission and conveyor pulleys of all types, including cast-iron, steel and wing-type.

DRILL BITS, ACCESSORIES—Kennametal, Inc., Latrobe, Pa. Catalog M-5 describes and illustrates the application and

36 MORE *Femco* TROLLEY-PHONES

installed in mines last month

CONTINUOUS COMMUNICATION from mine-mouth to face . . .

You talk in a natural voice to any moving or stationary location anywhere in the mine.

Increases Tonnage
Promotes Safety
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Ask for demonstration

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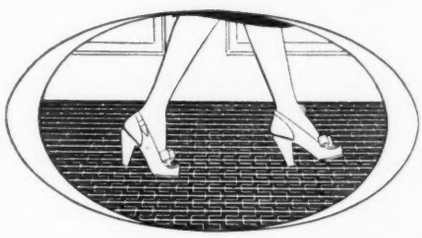
THE **SAFE** OPEN STEEL FLOORING IS **TRI-LOK**



No object over ½ square inch can pass through super-safe U-Type Tri-Lok Flooring. Fabricated without bolts, rivets or welds, it is unsurpassed for plant installation, walkways, loading platforms. Efficient distribution of concentrated loads . . . maximum free opening for light and air. Write for Bulletin JW1140.

DRAVO CORPORATION

National Distributor for the Tri-Lok Company

Dravo Bldg., Pittsburgh 22, Pa.

Sales Representatives in Principal Cities

DRAVO

WHEN OTHER MACHINES ARE "MOVING UP"

Bucyrus Walkers are MOVING DIRT

MUCH time ordinarily spent on moving about is converted into productive digging time when you put a Bucyrus-Erie walking dragline on your operations. The reason is simply that a Bucyrus-Erie cuts moving time by taking the most direct route. It can walk safely and surely in any direction, can change course by a mere swing of the revolving frame; no special steering mechanism is used — or needed. The machine is always ready to step off in any direction necessitated by working conditions—away from slides, along the edge of a steep bank, around obstructions, out of trouble's way.

With its exclusive rolling-cam walking traction, a Bucyrus-Erie takes every step safely, smoothly, quickly, cushioning the machine down. Rough ground seldom bothers because the walking shoes are mounted to pivot sidewise, conforming to any ground surface for a firm grip.

The walking efficiency of a Bucyrus-Erie gives you more time to use its "years ahead" digging efficiency!

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Booms: 110 to 250 ft.
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SOUTH MILWAUKEE, WISCONSIN

advantages of the Kennametal line of drill bits for stripping and underground drilling, special bits, augers and accessories, grinders and grinding wheels. Prices, specifications and test results for the various bits are included.

TRACTOR—Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. Catalog describes in detail the various features of the A-C HD-5 crawler tractor, with photographs and cutaway views illustrating its construction and operation.

MINING MACHINERY AND EQUIPMENT—National Mine Service Co., Beckley and Logan, W. Va.; Jenkins and Madisonville, Ky.; and Forty Fort, Pa. Bulletin No. 489, "At Your Service," offers an over-all picture of the company's services, products manufactured and distributed and facilities at each of its five divisions.

ELECTRIC MOTORS—Electric Machinery Mfg. Co., Minneapolis 13, Minn. Four bulletins as follows: features and operation of bracket- and pedestal-bearing synchronous motors, Bulletin No. 1200-PRD-175 for low-speed motors (below 500 r.p.m.) and Bulletin No. 1100-PRD-181 for high-speed motors (above 500 r.p.m.). "Heavy-duty" squirrel-cage induction motors, Bulletin No. 1300-PRD-190 for two-pole motors and Bulletin No. 1300-PRD-189 for motors of four or more poles.

TUNNEL FORMS AND EQUIPMENT—Robert S. Mayo, construction engineer, Lancaster, Pa. Bulletin No. 12 illustrates and describes the company's line of traveling steel forms for tunnels, sewers, conduits and walls, and special tunnel equipment such as shields, air locks and jumbos.

CRUSHER—Pennsylvania Crusher Co., Liberty Trust Bldg., Philadelphia 7. Bulletin No. 3008 discusses the construction, operation and application of the Pennsylvania Bradford breaker in coal preparation, stressing its advantages in the removing of hard refuse.

STEEL TUBING—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Bulletin on steel tubing contains information on seamless and welded carbon-steel tubing, stainless tubing and pipe, structural tubing and seamless and welded boiler tubes. Applications, fabricating, specifying and reference data are included.

CENTRALIZED LUBRICATION — The Farval Corp., 3249 East 80th St., Cleveland 4, Ohio. Bulletin, "Studies in Centralized Lubrication," offers examples of the savings made on some of the machines in modern industry through use of Farval lubricating systems and suggests opportunities for similar reductions in cost and increased output from their application.

BELT CONVEYORS—Transall, Inc., 109 North 11th St., Birmingham 4, Ala. Bulletin illustrates and describes the new Transall belt-conveyor idler and also outlines the features and advantages of the company's complete belt-conveyor systems, as well as its service in engineering, manufacturing and installation of such systems.

TREATED WOOD—Wood Preserving Division, Koppers Co., Inc., Pittsburgh 19, Pa. Booklet describes 10 ways to cut mining costs by use of pressure-treated wood and discusses use of pressure-treated ties in haulageways, turnouts and at the face; use of timber sets and props; and the use of pressure-treated wood in mine-car bottoms, air shafts, stairways, cribbing and trolley poles.

MECHANICAL RECTIFIERS—I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30. Bulletin No. 4809 discusses the solution of the problem of low-voltage power conversion through the medium of mechanical rectifiers. The history of the development of the unit, its characteristics and principles of operation are outlined in detail, and the possibilities of mechanical conversion are particularly treated.

ELECTRIC MOTORS—General Electric Co., Schenectady, N. Y. Bulletin No. GEA-5113 describes the construction, and characteristics and performance of the company's new Tri-Clad line of high-speed synchronous motors, "900 series."

METALLIZING—Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y. Catalog No. 401 covers the company's complete line of metallizing equipment and supplies and includes descriptions and illustrations of metallizing guns for various purposes, air and gas controls, spray booths and dust collectors, blast machines and nozzles, and air compressors.

LUBRICATING VALVE—Titeflex, Inc., 487 Frelinghuysen Ave., Newark 5, N. J. Bulletin covers the Grannan lubricator valve for single-line centralized lubrication systems and includes data for selection and installation.

COAL SAMPLER—Heyl & Patterson, Inc., 55 Water St., Pittsburgh 22, Pa. Bulletin, "What Makes the H & P Thorsten Automatic Coal Sampler Tick," illustrates and describes the operation of this unit and its adaptation to any type of conveying system.

AUTOMATIC CONTROLS — Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa. Catalog No. ND4A(1) outlines some of the many ways that modern automatic controls are helping industrial users to improve operating efficiency. The units are said to be applicable to practically any process which can be controlled by moving a valve, vane or damper.

WELDING — Eutectic Welding Alloys Corp., 40 Worth St., New York 13. July-August issue of Eutectic Welder bulletin announces the latest improvements in the company's low-heat welding alloys: Eutectrode 24, for cast-iron welding without preheat; Eutecrod 185FC with new, improved flux-coating; Eutecrod 1805FC, for joining copper; and Cuttrode, in size 3/32 in. for cutting thin sheet metal using no special equipment.

SLING CHAINS—Cleveland Chain & Mfg. Co., Cleveland 5, Ohio. Bulletin No. SC-48 describes Sterling wrought-iron sling chains and includes sling-chain safety rules, data on chain inspection, use and care, specifications and recommended load limits.

GAS ANALYSIS — Burrell Technical Supply Co., 1942 Fifth Ave., Pittsburgh 19, Pa. Bulletin No. 213, "Burrell Industrial Gas Analyzer," describes the construction features and operation of the two units available for speedy control analysis of gas mixtures containing any or all of carbon dioxide, carbon monoxide, methane, oxygen, hydrogen and nitrogen.

CONTROLS—Wheelco Instruments Co., 847 West Harrison St., Chicago 7. Bulletin No. Z6500, "Electronic Controls," contains a listing of standard instrument models in the company's line of indicators, controllers, recorders and combustion safeguards.

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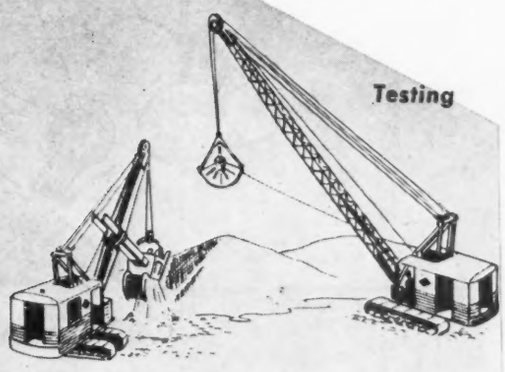
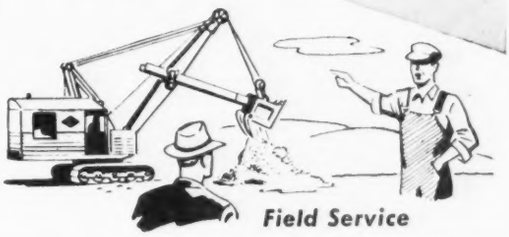
helps you keep your LIMA equipment ON THE JOB!

Design Engineering



Testing

Service Bulletins



Field Service

We, at LIMA, recognize how important it is to our customers to keep equipment operating continuously. We know that in most cases shovel or crane failure "shuts down the works". That's why we have established a hard and fast policy of doing everything we can to *make LIMA equipment STAY ON THE JOB!*

FIRST, our engineers have designed a machine with extra ruggedness and stamina to take the punishment they know it will get. Capacities are achieved by proper design and rugged construction rather than by adding dead counterweight. Many exclusive features are built in to provide greater endurance. Each machine is subjected to gruelling tests on our own proving ground before shipment.

SECOND, we assume the obligation of providing our customers and their operators with complete instructions as to proper handling and maintenance.

THIRD, we take a keen personal interest in every machine sold. Our agents and service engineers are always at your service—to keep your equipment at top efficiency *on the job*. Orders for maintenance parts get the green light in our shipping department—and are dispatched the same day whenever possible. We are as concerned as you are to keep your "down-time" to a minimum.

The LIMA line includes: SHOVELS—¾ to 6 yds. CRANES—13 to 100 tons—DRAGLINES—Variable

LIMA Type 802 shovel with 24'-6" boom and 2 cubic yard dipper excavating rock

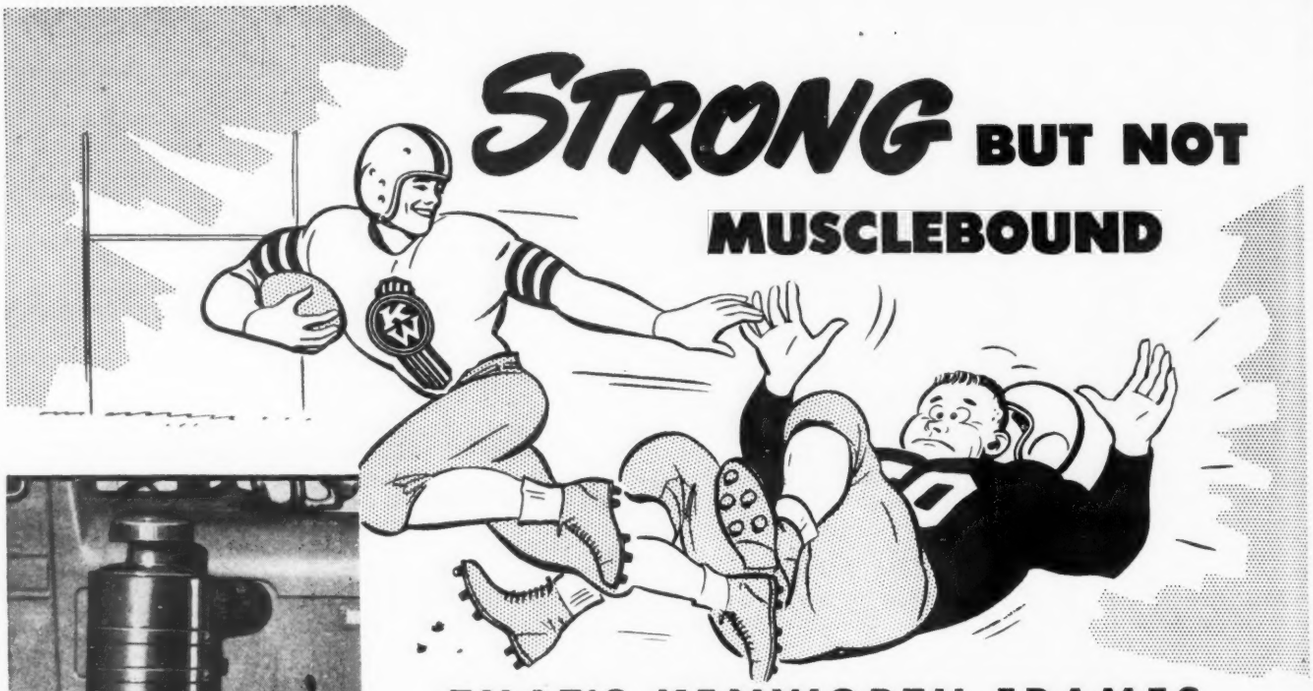
Lima Shovel and Crane Division

LIMA, OHIO

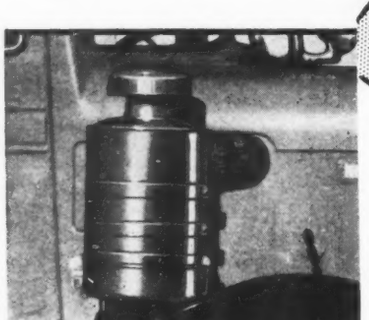
OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION

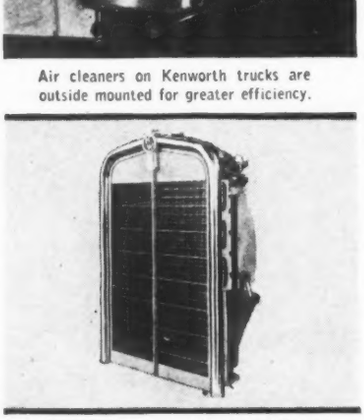
STRONG BUT NOT MUSCLEBOUND



THAT'S KENWORTH FRAMES

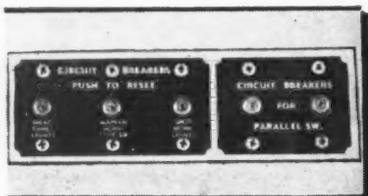


Air cleaners on Kenworth trucks are outside mounted for greater efficiency.

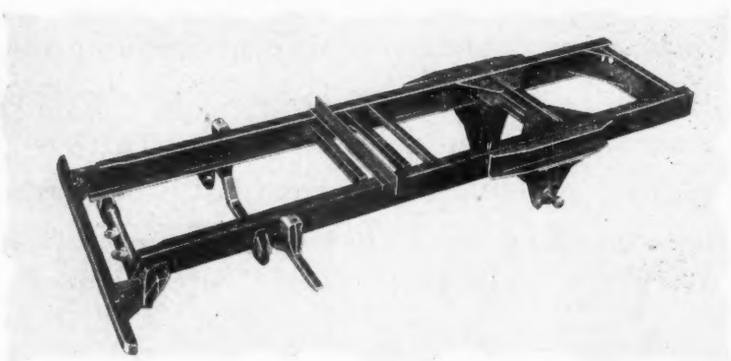


Better cooling is assured by Kenworth's tube and fin high-efficiency type radiators.

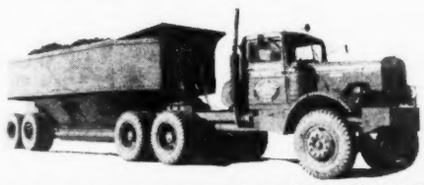
Greater comfort for the driver has been designed into each Kenworth truck.



Kenworth trucks need no fuse replacements because of manually reset circuit breakers.



A truck's frame is its backbone, and a good backbone—whether it's at work on the gridiron or the highway — requires strength, and yet must be flexible, if it is to do the job well. Kenworth truck frames give you just that—ruggedness and strength without rigidity. Kenworth frames are constructed of the best chrome manganese heat-treated alloy steel. Large section rails, deep and numerous cross-members and large gussets are riveted with ample size and number of rivets. Aluminum frame rails and castings are also available. Kenworth's leadership in frame design and construction is another reason why *there's more* **WORTH** *in* **KENWORTH.**



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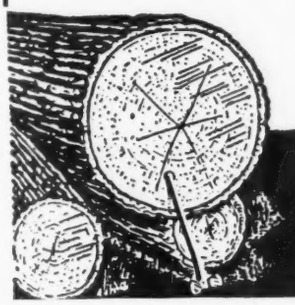

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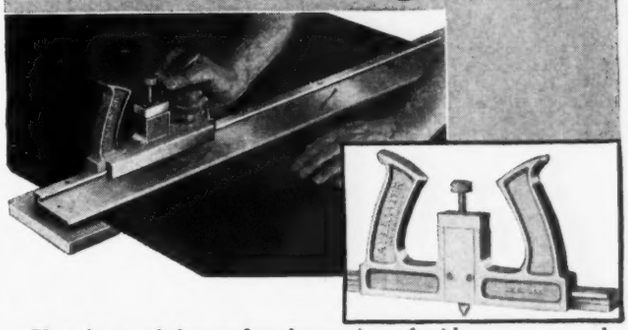

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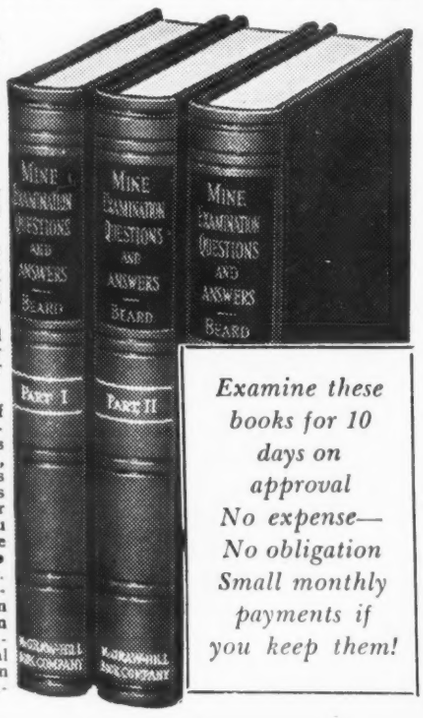

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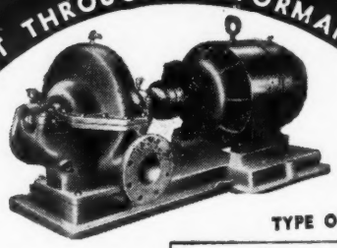

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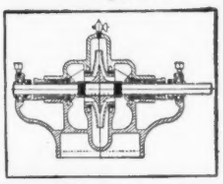

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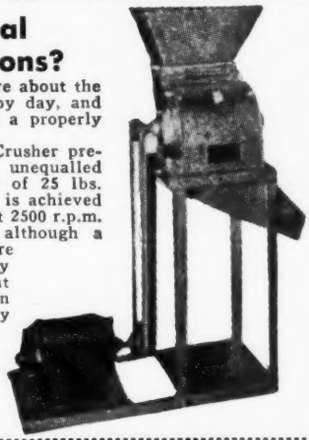

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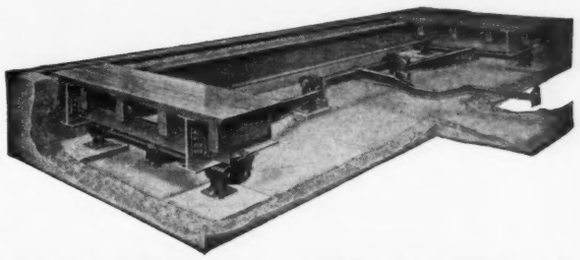

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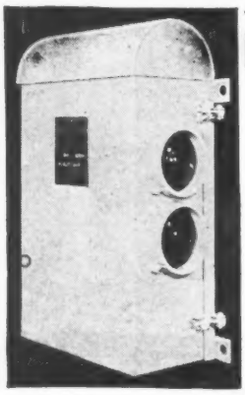

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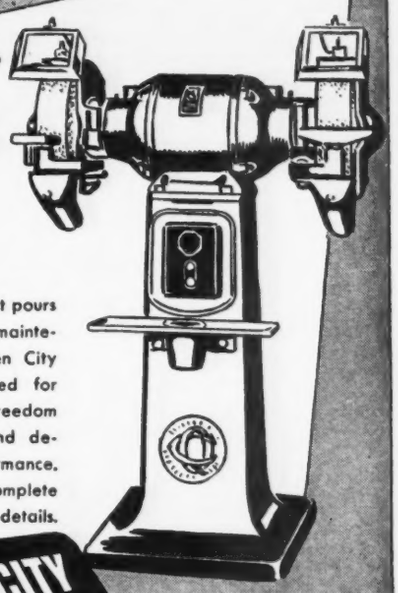

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Of Coal Age, published monthly at Chicago, Ill., for October 1, 1948.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Coal Age, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semiweekly or triweekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse of this form, to wit:

1. That the name and address of the publisher, editor and manager is: Publisher, McGraw-Hill Publishing Company, Inc.; Editor, Ivan A. Given; Manager, H. R. Mathias, all of 330 West 42nd Street, New York 18, N. Y.

2. That the owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 18, N. Y. Stockholders holding 1% or more of stock: Curtis W. McGraw, Executor of the Will of James H. McGraw, 330 West 42nd Street, New York 18, N. Y.; James H. McGraw, Jr., 330 West 42nd Street, New York 18, N. Y.; James H. McGraw, Jr., Curtis W. McGraw and Willard T. Chevalier, Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, 330 West 42nd Street, New York 18, N. Y.; Edwin S. Wilsey and Curtis W. McGraw, Trustees for: James H. McGraw, 3rd, Madison, New Jersey; Curtis W. McGraw, 330 West 42nd Street, New York 18, N. Y.; Donald C. McGraw, 330 West 42nd Street, New York 18, N. Y.; Mildred W. McGraw, Madison, New Jersey; Grace W. Mehren, 536 Arenas St., LaJolla, Calif.; Jacob L. Hain, 1 North 5th St., Reading, Pa.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

J. A. GERARDI, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.
Sworn to and subscribed before me this 24th day of September, 1948.
[SEAL] ELVA G. MASLIN.
(My commission expires March 30, 1950.)

WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

WANTED

Representative who is now selling users of heavy duty equipment such as Quarries, Road Contractors, Deep Mines, and Coal Strippers to take on a line full time or on a part time arrangement. If you now have an active number of accounts, each one is a potential user. Rate of commission comparable with manufacturers of heavy duty equipment. An excellent opportunity to handle a line for an old reliable company. We carry accounts commissions paid on receipt and approval of orders.

R.W. 6752 Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

1—36" gauge Goodman Standard Cutting machine, model 12AB, with truck and reel in good condition.
1—Chicago post mounted drill, 250v. D.C.
1—12" Tubing Blower 250v. D.C.
1—Cooper-Bessemer 75 H.P. gas engine direct connected to 35 K.W. Westinghouse 250v. D.C. Generator and switchboard.
1—WL70 Sullivan Compressor, V belted to 250v. 15 H.P. D.C. motor mounted on steel car.
5—Motors, 3 to 10 H.P. 250v.

R. W. KERRY & SONS COAL
R. D. #1, Harmony, Pa.

FOR SALE

1—75 K.W. Crocker Wheeler, 275 volt generator D.C., 250 R.P.M., price $1,000.00.
1—35 K.W. Crocker Wheeler, 250 R.P.M. volt, $450.00.
1—Kohler light plant, $250.00.
200 ft. of tipple conveyor chain, $1.00 per ft.
Many other sizes of motors, 5 to 30 H.P.

PAUL S. FISCUS,
R. D. 1, Leetonia, O. Phone 3755

FOR SALE

6,400 Ft. 26" 4-Ply Rubber Covered Conveyor Belting, ⅜" Top and 1/32" Bottom Covers. Mildew treated.

A. J. SKIPWORTH
Dunmor, Kentucky **Phone 26**

WANTED

WANT BUY FOR EXPORT

2—6 to 10 YD. STEAM OR
DIESEL OR ELEC. STRIP SHOVELS

DARIEN CORP.
60 E. 42nd St., New York 17, N. Y.

-TRANSFORMERS-

TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
Station M **Since 1912** **CINCINNATI 27, OHIO**

WANTED

¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

WANTED AIR COMPRESSORS

2—1,000 FT. TO 2,600 FT. CAP.
ADVISE WHERE INSPECT & DETAILS

DARIEN CORP., DARIEN, CONN.

WANTED

Good Used Lump Coal Loader, Self Feeding, Self Propelled, for Loading Trucks from Lump Stock Pile.

McGINNIS & GRAFE, INC.
PO Box 521, Henryetta, Oklahoma

LOCOMOTIVES FOR SALE

2—65 ton, WHITCOMB diesel-electric, new 1943, 566 HP, tractive effort 43,300 #.
1—45 ton, DAVENPORT diesel-electric, new 1942, four traction motors, railway type, Cooper Bessemer diesel unit, rear end cab.
1—44 ton, GENERAL ELECTRIC diesel-electric, built new October, 1944, 380 HP, four traction motors, Caterpillar D-17000 diesel units.
1—35 ton, PLYMOUTH diesel-mechanical, powered by Cummins Model L1-600 unit, excellent condition.
1—25 ton, GENERAL ELECTRIC diesel-electric, new 1942, powered by Cummins Model HB1-600 unit, one traction motor, tractive effort 16,000 #.
2—50 ton, PORTER steam side tank type switching locomotives, new in 1943, pressure 210 #, tractive effort 21,600 #.
2—80 ton, LIMA type 0-6-0 steam switchers with tenders, new 1944, tractive effort 40,000 #, 21"x28" cylinders.

LOCOMOTIVE CRANES

1—ORTON 15 ton capacity, new 1942, steam double drums. Excellent.
2—OHIO 35 ton capacity, new 1943, gasoline powered, 60' booms, double drums outriggers.
1—OHIO 35 ton Model G, new 1942, steam operated, coal fired, 55' boom, double drums, outriggers.

CARS

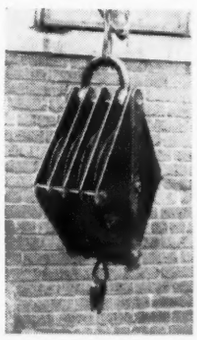
4—20 cu. yd capacity Austin Western air dump cars, cast steel truck side frames, will interchange.
16—50 ton capacity twin hopper cars, all steel, class "HD," all standard accessories, will interchange.
40—All steel 30 ton capacity gondolas, new in 1945. Cast steel truck side frames, will interchange.

Our stock includes many other locomotives, cars, cranes and heavy equipment items.
We invite your inquiries.

Write — Phone — Wire

PAN-AMERICAN ENGINEERING CO.

P.O. Box 2576 Telephone L.D. 339
Dallas, Texas



NEW BLOCKS

38 Triple and 60 Quadruple. Packed individually. 16" Sheaves. Loose side hook and becket.

Weight—Approx. 400# each. For 1" Wire Rope. Self lubricated. Bronze Bushed. Triple-oval shaped with hook. Quadruple—diamond shaped with shackle. Bought at bargain price from surplus.

Offer at sacrifice price, any quantity shipped any place, $45.00 each.

GLAZER STEEL CORPORATION
2100 Ailor Avenue, Knoxville, Tennessee
Telephone 4-8601

—RECLOSING BREAKERS—

1,500 Amp. on Panels (War Surplus)
G.E., West., C-H.
$250 EACH

S. M. DAVIS
510 Lasalle, St. Louis 4, Mo.

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for **IMMEDIATE DELIVERY** *of* **RUBBER PRODUCTS**

CONVEYOR BELTING, TRANSMISSION BELTING, ELEVATOR BELTING, FIRE, WATER, AIR, STEAM, SUCTION and WELDING HOSE

CALL WIRE WRITE **CARLYLE**
THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

NEW GUARANTEED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers	Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices — Mention Size and Lengths.

SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
¾"	25 feet	$4.25		35 feet	$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArclay 7-9793

FOR SALE

Used conveyor belting, 26", 4 ply, rubber covered.
4/0 Copper Wire.
1,000,000 CM Copper Wire.
24" Used Troughing and Return Idlers.
2—Goodman, Universal, Mining Machines, Type 112-AA, 250 V. DC.
1—12BU-7E Joy Jr. Loader, 250 V. DC.
2—Type 15" CC Joy Chain Conveyors, 250 V. DC, 300' long.
4—Model FFG La-Del Face Conveyors, 45' long, 250 V. DC, Permissible.

A. C. Mitchell
P.O. Box 18 Jonben, W. Va.
Phone Besoco 2372

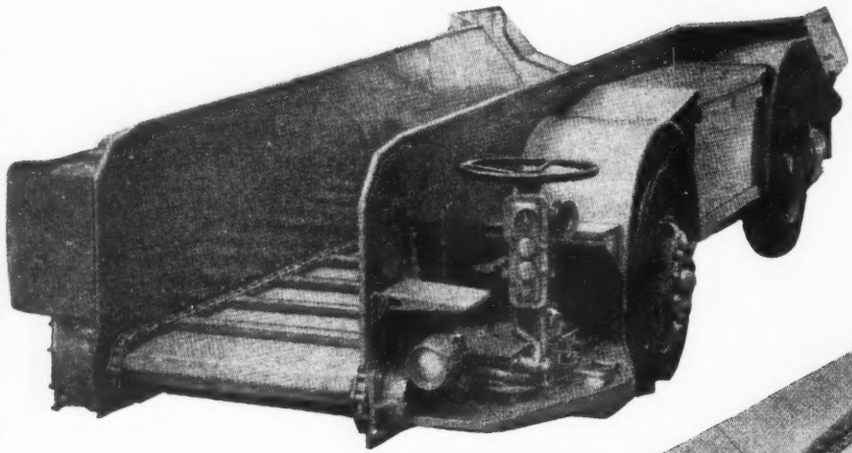
Bargains in Mining Equipment

120 Wood mine cars—36" gauge.
1500 ft. 6" Universal 6-ft. length Cast Iron Pipe.
2—Drag chain conveyors, 100 ft. long.
3—572 ac 3 ph. CP coal drills.
6—472 ac 3 ph CP coal drills.
2—24 B 220 volts ac Jeffrey Coal cutters—4½ and 6 ft. bars.
2—24 B Jeffrey dc cutters with 5½ ft. bars.
2—5-B-1 Sullivan dc 250 volt shortwall—10 hp, 6 ft. bar.
1—Goodman machine truck—with reel, 36" gauge.
1—100 kw 250 volts diesel gen. set—with sw board.
1—4-ton Jeffrey—MH-63—40" gauge locomotive.
1—300 ft. Ladel shaker conveyor.
All kinds of pumps and mine hoists.
1—30 kw—motor generator set—with sw board.

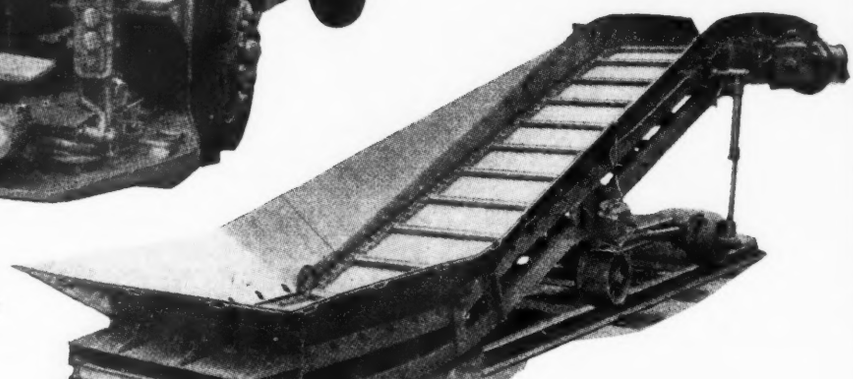
EMERSON ELECTRIC CO.
Birmingham, Alabama

COMPLETE LIQUIDATION
IMMEDIATE DELIVERY

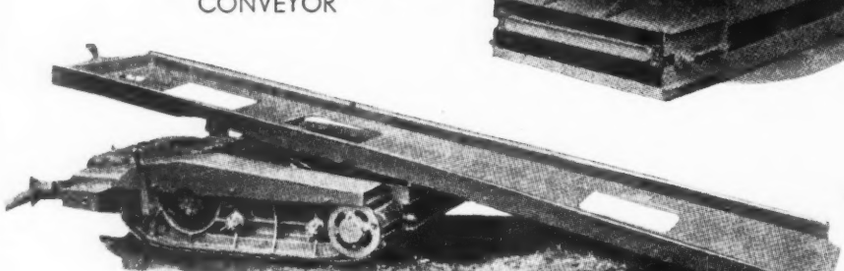
. . . New and nearly new coal mining machinery and equipment



LEFT:
JOY 42-D
SHUTTLE CAR



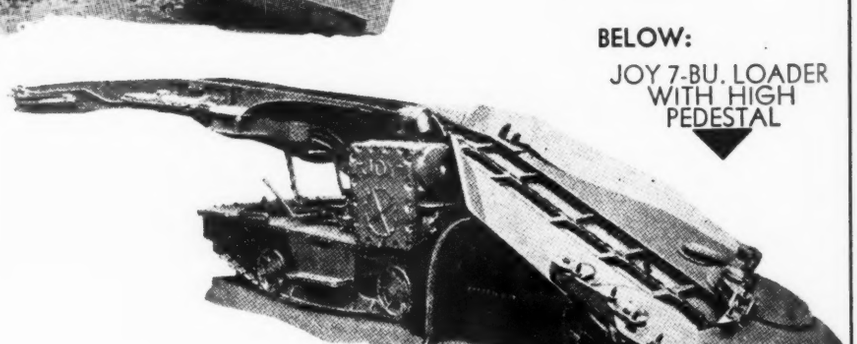
RIGHT:
JOY
SHUTTLE CAR
WITH ELEVATING
CONVEYOR



LEFT:
JOY "T-1"
MINING MACHINE
TRUCK

BELOW:
JOY 7-BU. LOADER
WITH HIGH
PEDESTAL

EXIDE AND GOULD
IRONCLAD BATTERIES



THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

...New and nearly new coal mining machinery and equipment

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

Here are some of the HARD-TO-GET OFFERINGS

(While They Last)

1—10 ton Jeffrey locomotive 36" ga. (trolley type), 250 v. D.C.

3 ton, 4 ton, 6 ton, 8 ton, 10 ton, 15 ton, and 20 ton G.E., Westinghouse, Jeffrey and Goodman locomotives.

COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" gauge TRUCKS, Type "M."

MINING MACHINE TRUCKS—Joy "T-1."

MOTOR GENERATOR SETS—1 set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. 1 set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.

BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.

MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.

TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.

BOX CAR LOADERS—Ottumwa-Manerre.

PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.

FANS—American Blower, Sturdevant.

TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.

VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.

SHAKER SCREENS—"Marcus" shaker screens.

CONVEYORS—Flight conveyors, elevator conveyors.

COAL CRUSHERS.

RAILS—150 tons 60 lb., 150 tons 65 lb.

SPIKES, bolts, tie plates, frogs, switches, switch throws.

COPPER trolley wire—2/0, figure 8 and 4.0 round.

TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.

TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor, Neoprene, glass, rubber insulated 2/0 to 500,000 CM. New.

JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.

SHUTTLE CARS—Joy 42D storage battery.

ELEVATOR CONVEYORS—Joy.

AIR COMPRESSORS.

CARDOX PLANT—Complete.

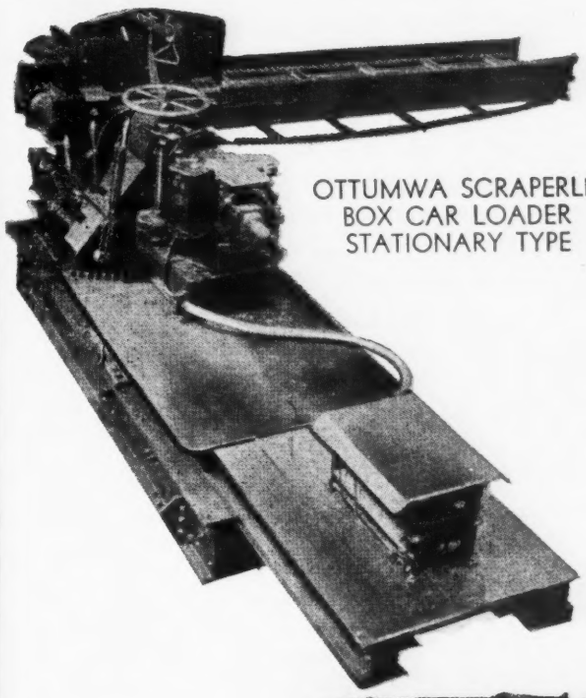
BATTERIES—Exide and Gould Ironclad, 24 cells.

$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

ROTARY CAR DUMPER for 36" gauge Cars With Automatic Control.

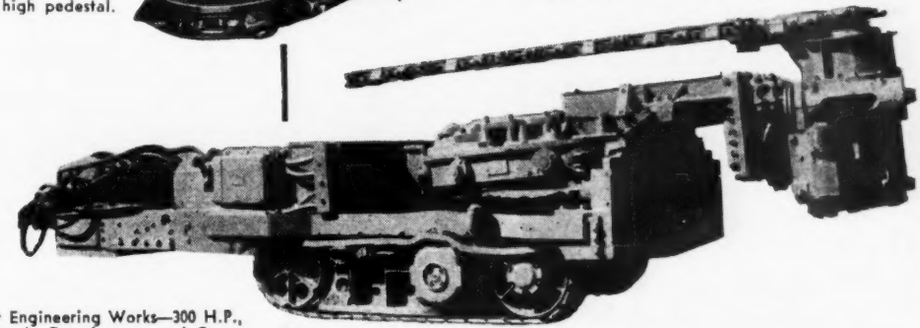
HOISTS—1 Double Drum Conical Hoist—Denver Engineering Works—300 H.P., Silent Chain Drive, Complete With All Panelboards, Transformers and Controllers and Numerous Others.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION



OTTUMWA SCRAPERLINE BOX CAR LOADER STATIONARY TYPE

GOODMAN TYPE 112 SHORTWALL COAL CUTTER



JEFFREY ARCWALL 29 L-E MINING MACHINE. CATERPILLAR MOUNTED

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

MOORHEAD ELECTRICAL MACHINERY CO.
PITTSBURGH 19, PA.

M-G SETS—ROTARIES
(3 ph. 60 cy.)

500 KW West. factory built M G Set—running inspection—consisting of 500 KW 250 v. 900 RPM cpd. interpole dir. conn. common base 714 HP Syn. Motor 8 P.F. 2300 v. with manual starting panel including magnetic excitation relays, also standard DC Panel. Good condition. Immediate shipment.

450 KW G.E. Factory built M.G. Set, 275 v. or 137.5 v. DC, 2300 v. 3 ph. 60 cy. AC, consisting of 2—229 KW Type MPC Generators, each 137.5 volt (operated in series for 275 v.) compound wound with interpoles, 720 RPM direct coupled to 710 HP Type AI Syn. Motor 2300 v. 3 ph. 60 cy. 720 RPM on factory base with AC and DC Panels.

300 KW 250 v. G.E. 600 RPM Rotary with 3—110 KVA Trans. 2300/4000 v.

100 KW West. SK 125 v.—150 HP West. Ind. 1200 RPM, 220/440 v.

150 KW West. 125 v.—250 HP Ind. 2200 v.

75 KW 75 v., West.—100 HP West. Ind.

50 KW 125 v. G.E.—75 HP G.E. 2200 v.

40 KW 250 v. West.—60 HP West. Ind.

35 KW G.E. 125 v. 1800 RPM—50 HP 220/440 v. Ind.

15 KW 125 v. Wotten—25 HP 220/440 v.

10 KW 125 v.—15 HP Master, 220/440 New.

AC AND DC GENERATORS

60 KW 60 v. 1000 amp. West SK Welding.

1 150 KW West. SK 125 v. 1200 RPM.

300 KW West. 250 v. 1200 RPM.

150 KW G.E. Type RC 550 v. 1150 RPM.

150 KW Triumph, 250 v. cp. wd. 600 RPM.

90 KW 60 v. 1500 amps. West. SK.

AIR COMPRESSORS

1100 cu. ft. 100 lbs. Chg. Pneu. 2 stage, 19" & 12"x12" with intercooler, aftercooler, unloader, air receiver dir. conn. 215 HP West. Syn. Motor 2200 v. 3 ph. 60 cy. 257 RPM with belted 8 KW SK West. exciter and manually operated starting panel. Good condition. Immediate shipment.

750 cu. ft. 100± pres. Chic. Pneu. 2 stage Type OCB 17 & 10 x 12".

356 cu.ft. 100± pres. Chic. Pneu. 12 x 10.

245 cu. ft. 100± pres. Ing. Rd. ER1, 10 x 10.

175 cu. ft. 100± pres. Chic. Pneu. 9 x 8.

164 cu. ft. Ch. Pneu. Steam Type.

AC MOTORS (3 ph. 60 cy.)

HP.	Make	Wdg.	Spd.	Type
300	G.E.	S.R.	600	I M
300	West.	S.R.	600	CW
300	G.E.	S.R.	450	I M
150	G.E.	S.C.	435	I K
150	G.E.	Swn.	600	ATI
125	West.	Syn.	277	
100	Al. Ch.	S.R.	600	ANY
100	G.E.	S.R.	450	I-M
75	G.E.	S.R.	600	I M
75	G.E.	S.R.	575	ITC
15	West.	S.C.	1750	CS
75	G.E.	S.R.	600	I M
75	G.E.	S.R.	575	ITC
50	G.E.	S.R.	900	I-K
50	West.	S.R.	600	CW658 D
50	G.E.	S.R.	900	I M
50/12½	G.E. 2200 v.	S.R.	900/450	I M
25	Cr.Wh	S.R.	580	
25	Cr.Wh.	S.C.	860	

LOCOMOTIVES
Haulage and Gathering Locomotives

20 Ton Jeff. & G.E. 550 v. 42" Ga.
(Can be rewound 250 v.)

13 Ton West. 36 or 40" Ga., 250 V.

8 Ton Goodman Explosion tested 500 v. 42/44" Ga.

6 Ton West. 250 v. 904 Motors 36" Ga.

STORAGE BATTERY LOCOMOTIVES

6/7 Ton Jeffrey 42/44" Ga. BB Motors.

6 Ton G.E. perm. 36/44" Ga. HM 825 BB.

5½ Ton Ironton Type A 36/42 Ga.

MINING MACHINES

112 EG3 Goodman AC Univ. Shortwall 440/3/60 #6593—35 HP Flameproof. 6½' bar.

2—112 EJ Goodman Universal, 230 v., 7½' bars.

2—12 DA Goodman 250 v. DC 6½ to 7½' bar.

2—35 B Jeffrey, 250 v., 6½ to 7½' bars.

DC MOTORS

HP.	Make	Voltage	Wdg.	Speed
15	West. SK 110	230	cp.	750
15	West. SK 83	230	cp.	950
15	Cr. Wh. CM	230	sh.	1400/1700
20	West. SK70L	230	cp.	1750
20	Cr. Wh. CMC	230	sh.	1200/1700
20	G.E. DLC	500	sh.	400/1200
20	West. SK 110	230	sh.	900
25	West. S.	230	sh.	325/975
25	West. SK 113	230	cp.	900
40	G.E. RC 34	230	sh.	750
40	G.E. RC	230	sh.	1150
50	West. SK	230	sh.	1750
60	Rel. T461	230	sh.	800/1200
125	West. SK 193	230	sh.	450/1000
200	G.E. RC	500	cp.	875
375	West.	230	cp.	430/860

ENGINE & TURBINE UNITS

6-cyl. Sterling Gas or Gasoline Engines, 72 HP at 800 RPM to 210 HP at 2,000 RPM.

50 KW West.—Turbo 125 v.

100 KW Delco 250 v. Gen.—Superior Diesel.

300 KW West. 125/250 v. DC—West. Turbine 440± Pres.

2-400 KW G.E. 250 v.—Skinner Steam Eng.

HOISTS, CRANES AND PUMPS

400 HP Vulcan conical drum shaft Hoist.

400 HP Vulcan single fixed cylindrical drum 78" dia. 5' 4" wide—AC Motor.

300 HP Lidgerwood sgl. fixed drum, 6½' dia., 3' face, 5" flanges grooved 1⅛" cable, 300 HP G.E. 2300/4000/3/60 with magnetic control.

75 HP Diamond sgl. fr. 48" dia. 25" face.

75 HP Mead Morrison sgl. fr. drum—AC Motor.

1—50/75 HP 2 drum Meade Morrison slope.

50 HP Heyl & Patterson sgl. fixed drum, 4' dia., 4' face with AC or DC Motor.

40 HP Ligerwood sgl. ft. drum geared to A.C.

25 HP sgl. friction Hoist—230 v. DC Motor.

10 Ton Larry Car, 500/250 v. DC.

10 HP Fridy Car Puller, AC Motor.

Lawrence Cent.—50 HP, AC Motor.

Gardner Cent.—50 HP, 230 v., DC Motor.

Weinman Cent.—50 HP, 230 v., DC Motor.

CONVEYORS

G15 and G12½ Goodman Conveyors, 230 v. DC with pans and duckbills.

Jeffrey 30' Bucket Elevator Vertical Conveyor.

20" Belt Conveyor, 250' Centers, Complete.

30" Belt Conveyor, 1200' Centers, Complete.

MONO-RAIL HOISTS

3—½ Ton Conco—220/3/60 sgl. mtr.

3—½ Ton Shepard Niles, 230 v. DC.

1—1 Ton Sprague, 230 v. DC.

1—2 Ton Shepard Niles, 230 v. DC.

1—2 Ton Line Belt, 220/3/60 AC.

1—3 Ton Shepard Niles, 230 v. DC.

1—5 Ton Shepard Niles, 230 v. DC.

1—10 Ton Chisholm Moore Chain Block.

1—15 Ton Alfred Box, 220/3/60 AC.

MOTOR GENERATORS

500 KW G.E. SYN. 275 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.

500 KW G.E. SYN. 575 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.

400 KW G.E. SYN. 275 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.

400 KW WEST. SYN. 575 V. 2300/4000 V. 3 PH. 60 CY. 720 RPM. SWITCHGEAR.

300 KW G.E. SYN. 275 V. 2300 V., 3 PH. 60 CY. 1200 RPM. SWITCHGEAR.

SYNCH. CONVERTER

300 KW G.E. 575 V. 6 PH. 60 CY. 1200 RPM. Pedestal Type. 2300/4000 V. TRANSFORMERS and SWITCHGEAR.

LOCOMOTIVES

30-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.

20-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.

13-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.

13-T West. 250 V. 908-C Mts. 44"-36" Ga.

10-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.

10-T West. 250 V. 907-C Mts. 44"-36" Ga.

8-T West. 250 V. 906C Mts. 48"-36" Ga.

6-T West. 250 V. 903-B Mts. 32"-22" Ga.

6-T G.E. 250 V. HM-701 Mts. 32"-24" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK CO.

501 Grant Building Pittsburgh, Pa.

Wagner "CERTIFIED REBUILT"

M-G SETS—AC to DC

500 KW G.E. DC 250 V., synch. motor, 2300 V.
150 KW Cr. Wh. DC 250 V., synch. motor 440 V.
100 KW Whse. rotary converter, 250 V. DC output.
80 KW Star DC 250 V., synch. motor 440 V.

●

D.C. MOTORS—230/250 V.

150 HP Cr. Wh. b.b. TEFC 890 RPM.
100 HP Whse. SK 181 450/900 RPM.
80 HP G. E. CDM 1,800 RPM, b.b. drip (2).
75 HP Cr. Wh. CMC, 1150 RPM, b.b.
75 HP Allis-Ch. E, 500 RPM, auto starter.
60 HP Whse. SK 1700 RPM.
50 HP G.E. CD 123 850 RPM.
40 HP Whse. SK110L 1700 RPM.
40 HP Whse. SK133 850 RPM.
25 HP G.E. CD85, 1750 RPM.
25 HP Whse. SK 1100 RPM.
15 HP Whse. SK 850 RPM. (5).

●

Complete Stock A.C. Motors—New and Rebuilt Up to 500 H.P.—Sq. Cage, Slip Ring, Synch.

SPECIAL—600 H.P. G.E. slipring motor 360 RPM, 3/60/440 V.

Gear Head Motors Speed Reducers Pumps—Blowers

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1433 W. Randolph St. Chicago 7
ELECTRIC MOTORS · GENERATORS

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Pa.

AIR COMPRESSORS:
12—Belted, 360, 676, 870, 1,000, 1,300 ft.
12—Diesel 105, 315, 520, 676 & 1,000 ft.
6—Electric 1,300, 1,500, 2,200, 5,000 ft.

CARS & LOCOMOTIVES:
65-Ton G. E. Diesel Elec. Locomotive.
100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
8—100-ton, 45-ton, 30-ton Diesel Locomotives.
50—20 yd. cap. Air Dump Cars.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8,000 & 10,000 gal. cap. Tank Cars.
20—12 yd. Std. ga. Steel Dump Cars.

ELECTRIC LOCOMOTIVES:
15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:
12—100, 150, 180 & 480 K.W.

MINE LOADERS:
17—GD9, Elmco 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

STEEL TANKS:
6—50,000 and 100,000 gal. Tanks on tower.
30—8,000, 10,000 and 20,000 gallon capacity.
9—80,000 & 20,000 bbl. cap.

SHOVELS—DRAGLINES:
7—1 yd., 1½ and 2 yd. Gas & Diesels.
16 yd. Elec. 160 ft. Boom Dragline.

WANT BUY
Air Compressors and Locomotives.

R. C. STANHOPE, INC.
60 E. 42nd Street New York 17, N. Y.

CONVEYORS
BELT or DRAG

TRUCK SCALES—COAL CRUSHERS
COAL DRILLS
MINE FANS
JOY LOADERS
MINING & STRIPPING EQUIPMENT

WHAT DO YOU NEED?

INDUSTRIAL EQUIPMENT CORP.
910 First National Bank Bldg. ATlantic 6367
Pittsburgh, Pa.

COAL MINE EQUIPMENT FULLY RECONDITIONED

COAL CRUSHERS
1—26" American Ring Type.
1—24 x 20 Jeffrey Swing-Hammer Mill.

BELT CONVEYORS
2—24" 15 to 75' Long, with Ding's Pulley.
1—30" 30' Long, with 2 H.P. Gearhead Motor. New belt.
1—30" 70' Long, with driving mechanism.
1—36" 50' Long, with driving mechanism.

MAGNETIC PULLEYS
1—24" Dia. x 26" Face Stainless Steel Ding's, 5'6" Centers, complete with mechanism, charger and 1 H.P. Gen. Elec. Gear Motor.

VIBRATING SCREENS
1—3' x 6' Single Surface Tyler-Niagara, V-belted to 5 H.P. A.C. Motor.
1—3' x 6' Single Deck Plat-O, Flat belt drive to 2 H.P. A.C. Motor.

MOTORS—AC
1—⅓ H.P. New Leland Single Phase Motor.
4—½ H.P. New Leland Single Phase Motors.
2—1½ H.P. New Leland Single Phase Motors.
2—2 H.P. New Louis Allis 3 Phase Motors.
1—3 H.P. New Leland 3 Phase Motor.
1—5 H.P. New Leland 3 Phase Motor.
2—1½ H.P. Used G.E. 3 Phase Motors.
1—2 H.P. Used Wagner 3 Phase Motor.
9—5 H.P. Used G.E. 3 Phase Motors.
3—10 H.P. Used G.E. & West. 3 Phase Motors.
1—20 H.P. Used West. 3 Phase Motor.
2—25 H.P. Used G.E. 3 Phase Motors.
2—30 H.P. Used G.E. 3 Phase Motors.
3—35 H.P. Used G.E. 3 Phase Motors.
1—40 H.P. Used Allis-Chalmers 3 Phase Motor.
1—50 H.P. Used G.E. 3 Phase Motor.
1—75 H.P. Used G.E. 2200 volt, 3 Phase Motor.

AIR COMPRESSORS
1—8⅜ x 4¾ x 5 Chicago Pneumatic, 277 Cu. Ft. Displacement. V-belted to a D-4400 Caterpillar Diesel Engine—Semi-portable.

HOISTS
1—No. 22 Vulcan, with Man Cage, 30' Steel Headframe and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake. (Hoist purchased new in 1942).
1—Single Drum Gasoline Hoist, direct connected to 2⅝ x 4¼ Wisc. Gas. Engine.
1—15 H.P. Single Drum Hoist, direct geared to motor with controller and grids.

COAL WASHING EQUIPMENT
2—Rheolaveur Launders, complete with Steel Supporting Frame.
1—60" Dia. Dividing Table, direct connected to 2 H.P. D.C. Motor.
1—Galigher Auto. Sampler with adjustable stroke and direct connected to a 1/6 H.P. Motor.
1—12' x 10' Steel Hopper Bin.
1—70' x 12' Dorr Thickener Tank, complete with mechanism.

RAILS
50 Tons—65# Relaying Rail.
15 Tons—40# Relaying Rail.
15 Tons—60# Relaying Rail.
Plate Frog Switches—30# to 60#.

LARRY CARS
4—Connelsville Larry Cars, Trolley Operated, 6 Ton Capacity.

GENERATORS—DIESEL
4—D-13000 Caterpillar Diesel Generators, 75 KW, 440 Volts, A.C.

WAGON DRILLS
1—Ingersoll Rand, with drifter, all on pneumatic tires, used about 6 months.
1—Sullivan #LW-6, with drifter, on steel wheels.

STEEL TANKS
1—8'6" x 29'8" Steel Tank (Army Bolted Type) Open Top, Cap. 44,000 Gals.
1—6' x 18' Steel Horizontal Closed Tank.

SLUSHER HOISTS
1—Ingersoll Rand, 3 Drum, with direct connected 50 H.P. A.C. Motor, and 2—1½ Yd. Crescent Scrapers, unit used about 60 days.

COAL CUTTERS
2—Sullivan CE-7 A.C. Short Wall, Complete with Standard and Tip-turn Trucks, most machines with Power Cable.
New Cutting Machine Parts.

MINE FANS
1—8-H60 Jeffrey Aerodyne Exhausting Fan, with 75 H.P. Motor—Purchased new in 1942.

TROLLEY LOCOMOTIVES
2—7½ Ton Goodmans, 36" Gauge, 250 Volt D.C.

PIT CARS
150 Card Iron Works R.B. Pit Cars, 36" Ga.
1 Card Iron Works Rock Car, 90 Cu. Ft. Capacity.

MISCELLANEOUS EQUIPMENT
1—Nock & Garside Continuous Push-button Elec. Freight Elevator, with 25 H.P. A.C. Motor, Counter weights, etc.
2/0 & 4/0 Standard RC Copper Wire.
Fire Extinguishers.
Electric Mine Gongs.
1—Manierre Type Box Car Egg Loader, 18" x 12' Long belt & 5 H.P. A.C. Motor.
1—8' x 28' Double Deck Shaker Screen.
Wooden Wall Phones.
Wire Rope, ⅜" to 1¼"—new and used.
6—200 Gal. Galv. Steel Oil Tanks.
1—Jarecki Pipe Threader, ½" to 2", B.D.
1—Merriman Bolt Threader, ⅜" to 1⅜", B.D.
4—Steel Mine Cages.
3—37½ KVA Pittsburgh Transformers 440/110/220.
1—25 KW Crocker-Wheeler D.C. Generator with switchboard.
Chain Blocks, 1½ Ton to 2 Ton.

Write for Our Bulletin No. 9 and Utah List

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MACHINERY AND SUPPLY COMPANY

SUITE 904, EQUITABLE BUILDING **DENVER 2, COLORADO**

C. J. PARRISH, MGR.

Phone: Alpine 2803

Yards: Denver and Florence, Colorado

IMMEDIATELY AVAILABLE—MINING EQUIPMENT

MINING MACHINES

Jeffrey: 2—35B, 28A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 24B.
Goodman: 12A, 12AB, 12AA, 12GA, Shortwalls.
124 EJ Slabbers.
1—12G3, 220 volt.
1—Hitch Cutter for Cross Head timbers.
2—Goodman Slabbing Machines, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9.

SUBSTATIONS—275 volts, D. C.

1—75 KW G. E. Rotary Converter.
250 volt D. C. transformers.
220-440—2300/4000.
1—300 KW Westinghouse 3 phase converter.
275 D. C. transformers, 4000/6600 A. C.
1—100 KW Westinghouse MG set.
275 D. C. 2300 volt A. C.
1—100 KW G. E. MG Set.
275 D. C. 440 volt 400 A. C. in portable building.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30 B. 43". 1—5 ton, 2600-R.
1—50 ton, 8-30 36" gauge.
1—6 ton, type 8A.
Westinghouse Units: All 250 volts.
906, 103, 904 and 115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
6 ton, 803, 44" as is.
8 ton 839.
1—8 ton type HM 61, 36" gauge.

LOCOMOTIVES

5 ton 825, 44" and 36".
8 ton 839.
2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12. Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28A, 35BB, 35A, 29C, 29L, 35L.
Goodman: 30B, 20C, 12A, 12AB, 12AA.
General Electric: 801, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 102, YR2, 115, 250 V. Bracket Type, 150 KW G. E. RCC.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners: 2 Sullivan, 1 Diamond.
Bond Welders: Resistance.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x24", 30"x30", 18"x18", 12"x16".
1—Pulverizer 30" Williams #3 Coal Crusher.
Conveyors: Scraper type. Apron and grate bar screening type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators.
Drop Bar Supports: (Gooseneck) 29B and 29C.
1 Revolving head for 29C.
Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW.
1—AC Generator, 31.3 KVA, 3 ph. 208 volt, General Electric with Exciter.
Hoists, overhead: AC 3-60-400 1 ton and 2 ton. Crabs and Room Hoists. Also single and double drum.
Lathes: 48"x14' with Taper Attachment and 3-60-220 Motor.
Loading Machines: 2—Myers-Whaley #3 and 4.
1—4BU Joy loading machine.
1—12BU Joy loading machine.
Milling Machines: horizontal and vertical.
Mining Machine Trucks and 2 on Catts, for shortwall and arc wall.
Monitors.
Motor Starters and Controllers: AC and DC. Synchronous Motor Starters, full magnetic, across the line. 3-60-4150. 2—200 H.P. and 7—250 H.P.
1—165 H.P., 440 volt for slip ring motors.
1—100 H.P., 250 volt D.C. Both reversible.
Pumps: Rebuilt and New.
Scales:. Mine Car and Truck.
1—Slate Larry.
1—Car haul trip maker.
Transformers: 4—55 KVA 23,100/12,000 to 103/208. 3—35 KVA, 22,000/12,000 to 178/90 volts. 3—100 KVA 6,600/12,000 to 2,300.

GUYAN MACHINERY COMPANY, Logan, W. Va.

Electrical Equipment

Converters, Motor Generator Sets, A.C. and D.C. Motors, Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years engineering background.

C. B. LOCKE CO.
P.O. BOX 3227
TEL. 38-136
CHARLESTON, W. VA.
NEW and REBUILT

MOTORS

150 HP, 900 RPM, Elec. Mach 220/3/60 Syn.
80 HP, 1200 RPM, Cr. Wh. 220/440/3/60 Ind.
75 HP, 900 RPM, Elec. Mach. 220/3/60 Syn.
75 HP, 1800 RPM, U. S. 220/440/3/60 Ind.
65 HP, 1200 RPM, GE 220/440/3/60 Ind.
50 HP, 1200 RPM, GE 220/3/60 Slip Ring.
30 HP, 1200 RPM, GE 220/3/60 Slip Ring.
5, 7½, 10 and 15 HP new and used tefc & open
5 to 100 HP DC motors for stock shipment.

OTHER EQUIPMENT

100 KW, 1400 RPM Whse. SK, 250 V. DC Generator.
175 KW, Whse. 300 V. 3 ph. 60 cy. 1200 RPM pedestal synch. rotary converter.
(6) 110 KVA, 2200/186/1/60 converter transformers.
(3) 25 KVA, 2400/220-440/1/60 standard transformers.
60 to 90 days shipment on new transformers.
Control and switching equipment in stock.

HIGH GRADE TOOLS

14x18x72 Gallmeyer Livingston Surface Grinder.
#3-12 Arter Surface Grinder.
#500 U K Hanchett Face Grinder.
#104-2 Rivett Internal Grinder.
42x42x20 Cincinnati Planer.
6" Pratt & Whitney Vert. Shaper.
#2B Simmons Micro Speed Turret Lathe.
24", 36" & 42" Bullard Vertical Turret Lathe.
#33 Lucas Horizontal Boring Mill.
20"x12' Boye & Emmes Lathe.
24"x16" American Geared Head Lathe.
2' to 7' Plain Radial Drills.
16" and 24" G & E Shapers.
New No. 3-4-5 Davis Keyseating Machine.

Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

IMMEDIATE SHIPMENT AT REDUCED PRICES

Conveyor for mines and tipples priced from	$ 665.00
Picking table, with motor and 48" belt	1,100.00
Stoker Coal crusher	474.00
Large coal crusher	1,074.00
15-ton truck scale	450.00
20-ton truck scale	510.00
33-ton truck scale, 34' platform	1,650.00
5-ton tipple scale	312.00
Vibrating screens, 2' to 5' wide, many lengths, 1 to 5 decks. All with screen cloth or plates to customers' specifications. Priced from	648.00

BONDED SCALE & MACHINE COMPANY
2190 S. Third St., Columbus 7, Ohio
Phone Garfield 2186 University 2832 Evenings

MINE HOIST: All steel construction, single drum, 8' dia., 3,700 ft. 1½" rope, single line pull capacity 73,000 lbs. with herringbone gears to operate at a speed of 200 or 600 FPM; motor 400 H.P., 580 RPM, 3 phase, 60 cycle, 2,200 volt, complete with all control equipment. Condition like NEW. Located in California.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW):
1—Piece 1014 ft.
1—Piece 1017 ft.
1—Piece 268 ft.
6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover, on original reels.
All NEW, NATURAL RUBBER.

TURBO GENERATOR: Curtis Steam Turbine driven Generator Unit, 600 KW, 5 stage, 200 lbs. steam pressure, 3600 RPM, with condenser, General Electric Generator, 750 KVA 2300 volt, 3 phase, 60 cycle, with exciter, piping, valves, etc.

PUMP: Worthington 40 H.P. steam driven Centrifugal Pump, 300 lbs. steam pressure, 3550 RPM, with steam regulator. Complete, in new condition.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE, PA.
Phila. Phones: Madison 8300 - 8301

REBUILT MINING MACHINES

4—112 A. A. Goodman Universal, D.C.
3—112 G. 3 Goodman Universal, 220 volts A.C.
1—12 G. 3 Goodman Standard, 220 volts A.C.
4—35 B Jeffries Machines, D.C., 250 volts.
4—C E 7 Sullivans, A.C. and D.C.
2—7B Sullivans, A.C. and D.C. 250 volts.

LOCOMOTIVES

2—6 Ton Goodman type 33, Ball-bearing.
1—8 Ton Goodman type 32, Ball-bearing.
1—6 Ton G. E., 42 inch gauge.
1—5 Ton Mancha Storage Battery Locomotive, 42 inch track gauge, height 40 inches. Complete with Storage Batteries and Charging Panel.
2—6 Ton Westinghouse, Ball-bearing.

LOADING MACHINES

2—8 B.U. Joy, 42 in. gauge on Cats., D.C.
3—5 B.U. Joy, 42 in. gauge on Cats., D.C.

THOMAS GILLESPIE & SON
State Rd. 67 — Bicknell, Ind.
Phones 179 and 140 L. and 149 K.

FOR SALE

Modern Coal Tipple and Loading Ramp complete with McLanahan & Stone Crusher, picking table, vibrating screens and 100-ton storage bin. Capacity 500 tons daily. Located near Ashland, Kentucky. For further details write to:

Box 138, Middlesboro, Kentucky

7½ HP. 1750 R.P.M. TEFC
230 V., Fr. 284, D.C.
Imperial Elec. Co.,
War Surplus Bargain
S. M. DAVIS
510 LaSalle St., St. Louis 4, Mo.

BUY FROM STOCK

Caldwell 200 tons Horiz. Hydraulic Wheel Press.
Hendey 20"x10' Motorized Q.C.G. Lathe.
LeBlond 36"x30' Q.C.G. Engine Lathe.
Cincinnati #4 and #5 High Power Horiz. Millers.
American 24" Motorized Crank Shaper.

FALK MACHINERY COMPANY
18 Ward St., Rochester, N. Y.
Phone Main 6347

REBUILT EQUIPMENT—READY TO SHIP

AXIAL FLOW VENTILATING FANS

5—50" dia. 72½" long. 2 sets of propellers, 8 blades to each. Dim: of blade 14"x9½" curved mf'd by International. Size 114, driven by 100 HP., 1750 rpm, 220/440 v. 3 ph. 60 cy. A.C. Motor.

6—16000 CFM Buffalo Forge Co., 3" stat. pres. 1800/1200 rpm. con. 15/4.5 HP., 1710/1150 rpm., 3 ph. 60 cy. G.E. A.C. Motor 220/440 v. totally encl.

2—12000 CFM 3" stat. pres. Sturtevant with dir. con. 10/3 HP., 1775/1180 rpm., 220/440 v. West. CS. TEFC Motor.

1—7500 cfm Clarage with dir. con. 7½ hp., 1750 rpm., 3.3 hp at 1160 rpm., 220/440 v. 3 ph. 60 cy.

31—6000 cfm. Sturtevant Bulletin 512389, 3" stat. pres. 7 blade, dir. con. 5/1.5 HP., 1765/1175 rpm., 220/440 v. 3 ph 60 cy. West. TEFC Motors.

2—5000 cfm Sturtevant 1.8 stat. pres. 4.2/1.25 HP., 1750/1150 rpm., 3 ph. 60 cy., 220/440 v. ball-bearing motors.

1—4000 cfm 3" stat. pres. Sturtevant Axial Flow vent fan dir. con. 4/1.2 HP., 1750/1150 rpm., 220/440 v., 3 ph. 60 cy. Tot. Enc. West. Motor.

HOISTS

1—Welen—2 drum 8600± per drum, each drum is 6' cir. with 430 ft. of ⅝" cable per drum can be increased to take 600'. 120 FPM per drum, driven by 25 HP., 1750 rpm., 230 V. D.C. motor.

1—Single Drum Triple Reduction Hoist. 28" dia. drum, 20" face, 1" flange, 27 grooves for ½" rope—300' of rope with 10 HP., Westinghouse A.C. Slip Ring Motor 70/80 FPM.

HOISTS or WINCHES

200—1½-ton Hand Cranked ratio 27.1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.

CAR PULLERS

100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.

LOCOMOTIVES

6 ton Atlas, 230 v. D.C.—36" gauge.

SPECIAL BARGAIN

100 KW. Diesel Engine Generator Sets
1—100 kd., 250/275 v. D.C. Delco Generators dir. con. to 150 HP., GBD-8, 5½x7, 8 cyl. Superior Diesel Engines, elec. starting with muffler, power panel and accessories. ALMOST NEW—ONLY USED AS SPARES.

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

456—New, 1 HP. Cutler Hammer across the line.
111—New, 1 HP. Cutler Hammer across the line.
30—New, 2 HP. Cutler Hammer across the line.
55—New, 5 HP. Cutler Hammer drip proof 2 step current limit OL and LV.
58—New 7½ HP. Cutler Hammer.
12—10/15 HP. 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
9—New, 10/15 HP., 230 v. G.E.
10—New, 40 HP., 230 v. G.E. Magnetic.

PUMPS — with AC or DC Motors

Qua.	GPM	Head	Make
2	1300	277'	Worthington
2	1200	300	Worthington
2	1100	323	Worthington
2 New	1000	346	Worthington
1	1000	370	Worthington
2	900	365	Worthington
8	800	378	Worthington
2	800	150	Worthington
2	700	388	Worthington
2	600	182	Worthington
1	600	220	Dayton Dowd
2	600	393	Worthington
2	400	196	Worthington
1	332	202	Worthington

230 V. D.C. MOTORS

Qu.	HP	Make	Type	Speed
2	200	Reliance	1970T	400
1	150	Gen. Electric	RCP-36	1700
1	125	Westinghouse	SK-190	560
4	100	Reliance	1050T	400
2	100	Westinghouse	SK-180	640
1	100	Gen. Electric	RC-58	650
1	100	Westinghouse	SK	650
2	90	Westinghouse	SK-183	575
1	75	Westinghouse	SK-160	850
3 new	75	Cr. Wh.	TEFC	860
1	60	Westinghouse	SK-123	1750
1	60	Westinghouse	SK-153	850
2	50	Westinghouse	SK-143	850
1	35	Gen. Electric	DLC-203	700
2	35	Allis Chal.		1800
1	30	Allis Chal.		575
1	30	Westinghouse	SK-123	850

MOTOR GENERATOR SETS—250 V., D.C.

Motors 220/440 volt or 2200 volt, 3 phase, 60 cycle.

No.	KW	Make	Speed
1	5	Allis Chalmers	1200
1	5	Westinghouse	1150
1	7½	Westinghouse	1150
1	10	Westinghouse	1750
1	10	Allis Chalmers	1200
1	15	Crocker Wheeler	1700
1	20	General Electric	1200
1	20	General Electric	900
2	30	Westinghouse	1150
1	30	Reliance	850
1	30	Westinghouse	720
1	35	General Electric	850
2	50	Westinghouse	1150
1	60	Westinghouse	1100
1 NEW	75	Crocker Wheeler	900
1	75	Westinghouse	720
1	100	General Electric	2100
1	100	General Electric	1750
2	100	Delco	1200
1	100	Westinghouse	700
1	200	Westinghouse	720
1	200	Westinghouse	1150
3	250	Westinghouse	1200

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2	200	Reliance	500
1	110	Westinghouse-SK	700
4	100	Reliance	580
1	100	Westinghouse	720
2	100	Westinghouse-SK-180	900
6	100	Delco	1200
11	100	General Electric-RC	850
1	100	Westinghouse-SK	850
1	100	Westinghouse-SK	2100
3	75	Crocker Wheeler	1350
3	75	Crocker Wheeler	1150
2	75	Westinghouse-SK	720
1	75	Crocker Wheeler	1400
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50 KW Westinghouse motor generator set, DC end 250 volts, 200 amps, #11, type S, field serial #621994, commutator #11-1T-135B, 860 RPM, compound wound, AC end 75 H.P. Westinghouse induction motor, type CS, 3 phase, 60 cycle, 2200 volts, 18.1 amps. per terminal, 40°C temp. rise, 870 RPM, #4364186, complete with switchboard for DC end and compensator for AC end.

50 KW General Electric motor generator set, generator #256064, type BR, form C, I.S. 350070-39, 200 amps, 250 volts, 1740 RPM, cont. 50°C, direct connected to 75 H.P. General Electric induction motor, type KT337-4-75-1800, form B, 3 phase, 60 cycle, 220 volts, 174 amps, 1750 RPM, #4323202, cont. 40°C, complete with manual switchboard and compensator.

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1—35000# Nordberg Sgl. Drum AC.

1—10,000 lb. cap. Vulcan Sgl. Drum Hoist 4' x 4' drum 250 HP, AC.

1—5,000 lb. cap. Lidgewood Sgl. Drum Electric Hoist, 600 FPM, GE motor, 100 HP, AC.

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1—200 HP, GE 2300/3/60 AC 585 RPM Motor with control.

1—225 HP, GE Motor for 440/3/60 AC, 585 RPM with control.

1—300 HP new Allis Chalmers slip ring motor 600 RPM for 2300/4000 AC.

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1—G.E. mixed pressure, 140 lbs. 16 A.B.S. condensing, 750 K.V.A., 2300 volt turbo generator complete with auxiliary equipment.

The above turbo generators will be taken out of service in Nov., 1948, and can be inspected under load in the meantime.

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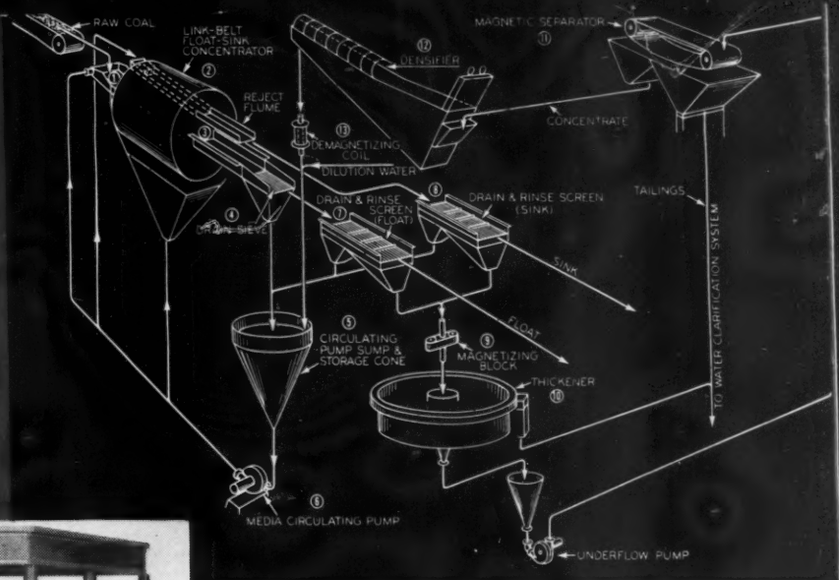
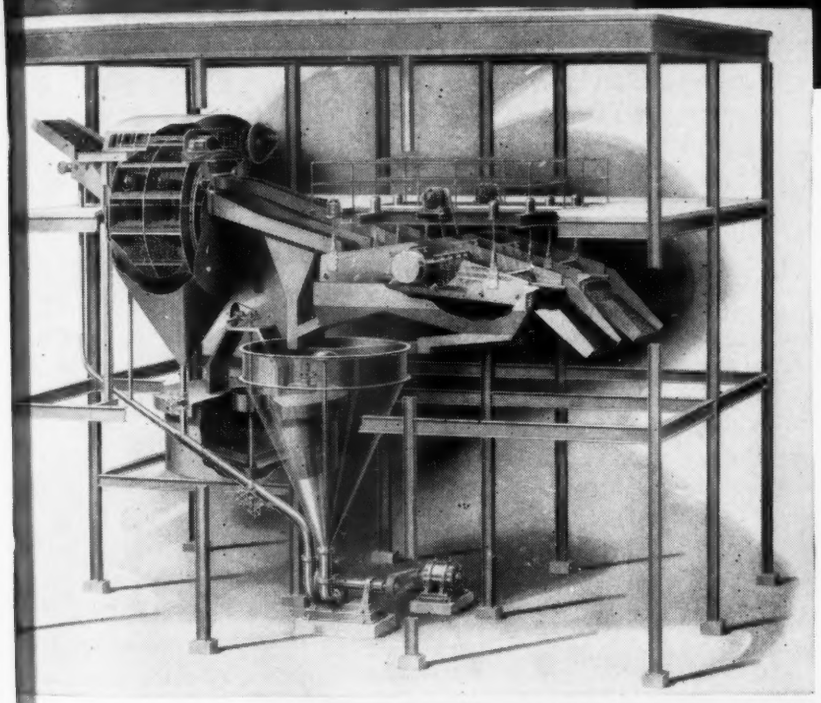
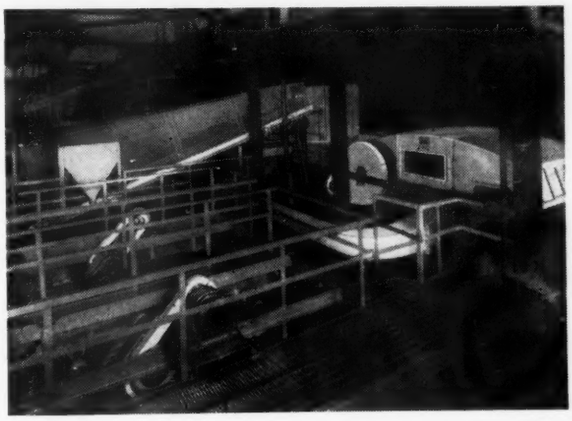
New LINK-BELT Float-Sink Concentrator for Heavy-Media*





The flow sheet above shows the paths of the coal and the heavy-media in the Link-Belt cleaning system featuring the Link-Belt Float-Sink Concentrator and auxiliary equipment. The drawing immediately above shows the concentrator, flumes, vibrating screens, thickener, sump, media circulating pump and storage cone. The lower illustration shows part of an installation in the Pittsburgh field.



*The Heavy-Media Separation Processes are licensed by the American Zinc, Lead and Smelting Company. American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. are their sole Technical and Sales Representatives for these processes.

New and repeat orders attest its efficiency & economy

Nothing succeeds like success! A Link-Belt Float-Sink cleaning plant in Pennsylvania has operated more than 2½ years and handled close to a million tons of coal. A repeat order has been received from this same company for a concentrator to handle a large tonnage of 8" x 3" bituminous coal. A cleaning plant of this kind is being installed in the anthracite field. A contract for 5 units has been placed in the West Virginia field. A contract for a total of 7 units has been placed for handling bituminous coal in a large metallurgical coal preparation plant. And more to come.

The Heavy-Media process, incorporating the exclusive Float-Sink Concentrator, cuts cleaning costs and improves coal quality. It makes sharp separations at predetermined and stable specific gravities of medium over a wide range of gravities. It handles large coal and is a modern method for mechanized mines to reduce manual picking. It requires only one operator. It can be started and shut down quickly and easily without loss of operating efficiency. Operating and maintenance costs are low.

Link-Belt Float-Sink Concentrator Book No. 2101 presents pictures and data on this new process. We'll be glad to send you a copy.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

Send for This New Book No. 2101

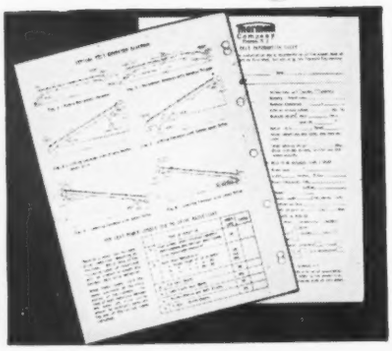
COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT

THE SYMBOL OF QUALITY — LB — LINK-BELT

Thermoid

Conveyor and Elevator Belting



There are several standard types of Thermoid Conveyor and Elevator Belting with different thickness and cover characteristics to suit the materials to be handled, angle of incline, speed of belt and other wear factors. Special constructions are available to meet extreme requirements. To check your needs accurately, fill out a Thermoid Conveyor (or Elevator) Belt information sheet, available upon request. The data you furnish will enable us to recommend the most satisfactory and economical belt for your job.

For Severe Service...

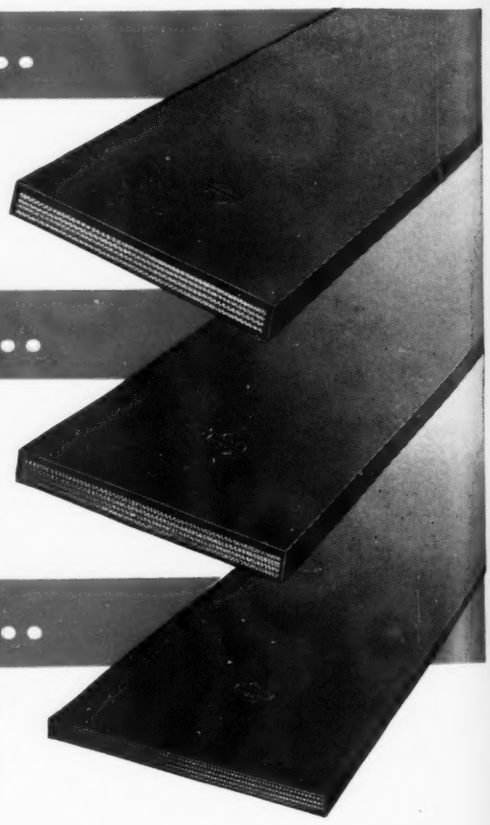
Thermoid "HT" Type—Built to carry highly abrasive materials under severe conditions. Supplied with 48 oz., 42 oz. or 35 oz. hard duck, 32 oz. or 28 oz. fabrics. Skim coat between plies. Average friction 20 to 24 lbs.; average tensile strength of covers 3500 to 4000 lbs. In widths, number of plies and cover thicknesses as specified. Maximum width 60″; approximate roll length 525 ft.

For Regular Service...

Thermoid "A" Type—Is built to carry moderately abrasive materials in regular service. Furnished with 42 oz., 35 oz. hard fabric, 32 oz. or 28 oz. fabric. Skim coat between plies; average friction 16 to 19 lbs.; average tensile strength of covers 2500 to 3000 lbs. In widths, number of plies and cover thicknesses as specified. Maximum width 60″; approximate roll length 525 ft.

For Light Service.....

Thermoid "C" Type—Is made to carry non-abrasive materials under light service conditions. Furnished with 28 oz. or 32 oz. fabric. Average friction 12 to 15 lbs.; average cover tensile 800 to 1000 lbs. Number of plies and cover thicknesses are optional. Maximum width 60″; approximate roll length 525 ft.



Other Thermoid Conveyor Belts made to meet special conditions: Neoprene, for use where oil and grease are present; "Ruff Top", for packaged goods; "HH", for high temperatures; and Canners, for fruits and vegetables—Information upon request.

The Thermoid line includes: **Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Custom Molded Products • Industrial Brake Linings and Friction Materials.**

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